PISA 2009: Achievement of 15-year-olds in Wales

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Contents

Acknowledgements vi

Executive summary vii

1 PISA – Background and overview 1

1.1 Introduction 1

1.2 The development of the survey 2

1.3 What PISA measures 2

1.4 What the scales mean 5

1.5 Survey administration 6

1.6 Interpretng differences between countries 7

1.7 Organisation of this report 8

2 PISA in Wales 9

2.1 Introduction 9

2.2 The PISA sample 9

2.3 PISA in the context of the National Curriculum 11

3 Reading 14

3.1 Introduction 14

3.2 Scores in Wales 15

3.3 Differences between highest and lowest attainers 17

3.4 Differences between boys and girls 21

3.5 Summary 22

4 Mathematics 23

4.1 Introduction 23

4.2 Scores in Wales 24

4.3 Differences between highest and lowest attainers 24

4.4 Differences between boys and girls 26

4.5 Summary 27

5 Science 28

5.1 Introduction 28

5.2 Scores in Wales 29

5.3 Differences between highest and lowest attainers 30

5.4 Differences between boys and girls 31

5.5 Summary 32

6 Schools 33

6.1 Introduction 33

6.2 School management 33

6.3 School climate 35

6.4 Resources 37

6.5 Assessment 37

6.6 Summary 38

7 Pupils and reading 39

7.1 Do pupils enjoy reading? 39

7.2 What do pupils read? 40

7.3 What happens in the classroom? 42

7.4 How do reading scores link with pupils' backgrounds? 43

7.5 Summary 44

8 PISA in the UK 46

8.1 Introduction 46

8.2 Reading 46

8.3 Mathematics 50

8.4 Science 53

8.5 Schools and pupils 55

8.5 Summary 56

References 58

Appendix A 59

Appendix B 74

Appendix C 79

Appendix D 84

Appendix E 85

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Executive summary

1 Background and overview

1.1 The Programme for International Student Assessment (PISA) is a survey of the educational achievement of 15-year-olds organised by the Organisation for Economic Co-operation and Development (OECD).

1.2 In the UK, PISA 2009 was carried out on behalf of the respective governments by the National Foundation for Educational Research.

1.3 Results for the United Kingdom as a whole are included in the international PISA report published by OECD. The four parts of the UK contribute to this result in proportion to their populations.

1.4 The survey takes place every three years. The first was in 2000, the second in 2003 and the third in 2006. PISA 2009 was the fourth survey. Wales did not take part in PISA 2000 and 2003.

1.5 A total of 65 countries participated in PISA 2009. This included 33 OECD member countries and 24 members of the European Union.

1.6 The Australian Council for Educational Research (ACER) led the international consortium that designed and implemented the PISA 2009 survey on behalf of the OECD. A second international consortium led by Cito developed the survey questionnaires.

1.7 Strict international quality standards are applied at all stages of the PISA survey to ensure equivalence in translation and adaptation of instruments, sampling procedures and survey administration in all participating countries.

1.8 The PISA survey assesses students in reading, mathematics and science. In each survey one of these is the main subject. Reading was the main subject in PISA 2000, mathematics in PISA 2003 and science in 2006. In PISA 2009 the main subject was once again reading.

1.9 Reading attainment is reported on three reading processes: access and retrieve, integrate and interpret and reflect and evaluate. In addition, reading attainment is reported for two text formats: continuous texts and non-continuous texts.

1.10 As well as tests for students, the PISA survey includes questionnaires for participating students and schools. In PISA 2009 these included some general background questions but mainly focused on attitudes to reading and aspects of the teaching and learning of reading. The questionnaires also included aspects of school management and school climate.

2 PISA in Wales

2.1 PISA 2009 is the second PISA cycle in which Wales has participated.

2.2 In Wales 132 schools and 3270 pupils participated in PISA 2009. This represented 87 per cent of sampled schools and 88 per cent of sampled pupils.

2.3 All tests and questionnaires were available in both English and Welsh.

2.4 The school response for the combined United Kingdom sample fell slightly below the target participation rate and as a result NFER was asked to provide some analysis of the characteristics of responding and non-responding schools in England. The PISA sampling referee was satisfied that there was no evidence of any potential bias in the UK results.

2.5 The pupil response in the United Kingdom exceeded the PISA requirement for participation of at least 80 per cent of sampled pupils. The final weighted response rate was 87 per cent.

3 Reading in Wales

3.1 In 29 countries, mean scores for reading were significantly higher than that of Wales. In 10 countries the difference in mean scores to that in Wales was not statistically significant. There were 25 countries with mean scores which were significantly lower than Wales.

3.2 The mean score for reading in Wales was below the OECD average and this difference was statistically significant.

3.3 Of the 29 countries with higher mean scores (where the difference was statistically significant), 22 were members of OECD. Three OECD countries had mean scores significantly lower than Wales (Turkey, Chile and Mexico).

3.4 Fourteen of the countries with mean scores significantly higher than Wales are in the European Union (Finland, Netherlands, Belgium, Estonia, Poland, Sweden, Germany, Republic of Ireland, France, Denmark, Hungary, Portugal, Italy and Slovenia). Two EU countries were significantly lower than Wales (Bulgaria and Romania).

3.5 There was variation in Wales' performance across the three reading processes and the two text formats. Wales' highest reading process score was attained on the reflect and evaluate scale, although differences between the scale scores were not large. Wales achieved a higher mean score on the non-continuous texts scale than on the continuous texts scale (see 1.9 above for a description of the PISA reading processes and text formats). A similar level of variation was seen in several other countries including many of the 29 countries which significantly outperformed Wales.

3.6 The spread of attainment in reading was similar to the OECD average, although there were fewer pupils at the highest levels of attainment than the average for OECD countries. In addition, Wales had a larger proportion of low-scoring pupils.

3.7 Girls scored significantly higher than boys in reading. This was the case in every participating country. However, Wales had one of the lowest scale point differences between girls and boys, with a difference of 27 scale points compared to an OECD average of 39 scale points. The gender difference in Wales was fairly evenly distributed across the different subscales for reading.

4 Mathematics in Wales

4.1 Mathematics was a minor subject in the PISA 2009 survey. A sub-sample of students was assessed in mathematics and there were fewer questions than in reading. The results

reported are estimates for the whole population, based on the performance of students who were presented with mathematics test items.

4.2 The mean score for mathematics in Wales was below the OECD average and this difference was statistically significant.

4.3 In 35 countries, mean scores for mathematics were significantly higher than that of Wales. In three countries the difference in mean scores to that in Wales was not statistically significant. There were 26 countries with mean scores which were significantly lower than Wales.

4.4 Of the 35 countries with higher mean scores (where the difference was statistically significant), eight are not OECD countries (Shanghai-China, Singapore, Hong Kong-China, Chinese Taipei, Liechtenstein, Macao-China, Estonia and Latvia). Four OECD countries had mean scores significantly lower than Wales.

4.5 Twenty of the countries with mean scores significantly higher than Wales are in the European Union and two EU countries were significantly lower (Romania and Bulgaria).

4.6 Wales had a low spread of attainment in mathematics compared with other countries. The proportion at the lowest levels was similar to the OECD average, while the proportion at the highest levels was below the OECD average.

4. 7 Boys scored significantly higher than girls in mathematics. This was the case in 39 other countries.

5 Science in Wales

5.1 Science was a minor subject in the PISA 2009 survey. A sub-sample of students was assessed in science and there were fewer questions than in reading. The results reported are estimates for the whole population, based on the performance of students who were presented with science test items.

5.2 In 20 countries, mean scores for science were significantly higher than that of Wales. In 15 countries the difference in mean score to that in Wales was not statistically significant. There were 29 countries with mean scores which were significantly lower than Wales.

5.3 The mean score for science in Wales was not significantly different to the OECD average.

5.4 Of the 20 countries with higher mean scores (where the difference was statistically significant), 13 were members of OECD. Six OECD countries had mean scores significantly lower than Wales (Luxembourg, Greece, Israel, Turkey, Chile and Mexico).

5.5 Eight of the countries with mean scores significantly higher than Wales are in the European Union. Four EU countries were significantly lower than Wales (Luxembourg, Greece, Romania and Bulgaria).

5.6 The spread of attainment in science was slightly wider than the OECD average. However, there was a similar proportion of pupils at both the highest and the lowest levels of attainment compared with the OECD average.

5.7 Boys scored significantly higher than girls in science. This was the case in 11 other countries. In 21 countries girls outperformed boys.

6 Schools in Wales

6.1 Headteachers in Wales reported a high degree of responsibility for most aspects of management of their schools. They also reported a higher frequency for most school leadership activities than the OECD average.

6.2 Schools in Wales showed a more positive climate and were less hindered by problems such as students skipping lessons and students disrupting classes than the OECD average. On the whole, pupils in Wales were positive about the climate of their school. They were generally more positive about the value of school and their relationship with their teachers than the average across OECD countries.

6.3 A lack of support personnel was the most frequently reported staffing problem by schools in Wales. The most frequently reported resource problems were shortages of computers and of computer software.

6.4 Schools reported that assessments serve various purposes. They are used most often to inform parents and to inform school improvement. Schools frequently used coursework or homework to assess pupils, although they also report frequent use of teacher-developed tests and teacher judgments.

7 Pupils and reading in Wales

7.1 Responses to statements measuring attitude to reading do not generally show very positive attitudes, although pupils in Wales were on the whole similar to the OECD average. A high proportion of pupils reported that they only read if they have to.

7.2 Attitude to reading had a positive connection with reading scores. Both internationally and in Wales, there was a large difference in scores between those who never read for enjoyment and those who do, even if only for a short time each day.

7.3 Pupils in Wales are more likely to read magazines and newspapers than fiction or non-fiction books. In this respect pupils in Wales are similar to the OECD average. Pupils' reports of the reading they do for school show that they spend more time on reading most types of text than the OECD average. In particular, they reported spending more time on reading non-continuous texts.

7.4 Pupils in Wales spend more time chatting online and reading emails than the OECD average but are similar to the average in the frequency of other online activities.

7.5 Pupils in Wales are better able to overcome disadvantage and achieve scores higher than predicted by their background when compared to some other OECD countries.

8 PISA in the United Kingdom

8.1 In reading, the mean scores in England, Scotland and Northern Ireland were similar. The mean score of pupils in Wales was significantly lower than that in the other parts of the UK. Girls outperformed boys in all parts of the UK, as they did in every other country in

the PISA survey. The spread of attainment between the highest and lowest scoring pupils was similar across the UK.

8.2 In mathematics the mean score in Wales was significantly lower than the mean scores in the other three parts of the UK. There were no significant differences between England, Scotland and Northern Ireland. Boys outperformed girls in all parts of the UK and this gender gap was relatively large compared with other countries. The spread of attainment was less in Wales than in the other parts of the UK.

8.3 In science as with the other two subjects there were no significant differences between England, Scotland and Northern Ireland but the mean score in Wales was significantly lower. Boys outperformed girls in all parts of the UK but the differences were small and reached significance only in Wales. The largest spread of attainment was in Northern Ireland.

8.4 The results from the pupil questionnaire tend to paint a negative picture of many pupils' reading activities in England, Wales and Northern Ireland. Many are not interested in reading, partake in few reading activities for pleasure and rarely visit a library.

8.5 Pupils in Northern Ireland had the largest achievement gap between those pupils that scored highest and lowest on the socio-economic scale, followed by England. The achievement gap in Wales was close to the OECD average.

8.6 There were differences in staffing and resource shortages, with schools in Wales and Northern Ireland having a greater shortage of resources but schools in England having more problems with staffing shortages.

1 PISA – Background and overview

1.1 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). In England, Wales, Northern Ireland and Scotland, the PISA 2009 survey was carried out on behalf of the respective governments by the National Foundation for Educational Research (NFER).

As a measure of educational outcomes, PISA complements the other educational indicators gathered by OECD members to make international comparisons. It assesses the knowledge and skills of pupils aged 15, as they near the end of their compulsory schooling. Pupils are assessed on their competence to address real-life challenges involving reading, mathematics and science. This aim differentiates PISA from other pupil assessments which measure their mastery of the school curriculum.

PISA is carried out on a three-year cycle. The first PISA study was in 2000 (supplemented in 2002), and repeated in 2003 and 2006. The next survey will be in 2012. The survey was undertaken in 43 countries in the first cycle (32 in 2000 and 11 in 2002), 41 countries in the second cycle (2003) and 57 in the third cycle (2006). In PISA 2009, 65 countries took part. Of these, 33 were members of OECD. Each round of PISA focuses on one of the three areas of literacy in which knowledge and skills are assessed: reading, mathematics and science. The main focus for the 2009 round was reading, with mathematics and science as minor domains.

In England, Wales and Northern Ireland, pupils sat the two-hour assessment in November 2009 under test conditions, following the standardised procedures implemented by all countries. In Scotland, the PISA survey was carried out earlier in 2009. With the focus in this round on reading, about two-thirds of the questions were on this subject. A proportion of the questions used in the two-hour test were ones used in previous cycles. This provides continuity between cycles that can act as a measure of change.

In addition to the PISA assessment, pupils completed a questionnaire. This student questionnaire provided information on pupils' economic and social backgrounds, study habits, and attitudes to reading and reading activities in school. A school questionnaire was also completed by the headteachers in participating schools. This provided information on the school's size, intake, resources and organisation, as well as reading activities available in the school.

Age, rather than year group, is used as the defining factor for participation in the survey because of the variance of grade levels and in policies on grade promotion around the world. The pupils who took part were mainly in year 11 in England and Wales, year 12 in Northern Ireland and S3 or S4 in Scotland.

1.2 The development of the survey

The Australian Council for Educational Research (ACER) led the international consortium that designed and implemented the PISA 2009 survey on behalf of the OECD. A second international consortium led by Cito developed the survey questionnaires. The 2009 survey built on the experiences of the three previous cycles. By using standardised survey procedures and tests, the survey aimed to collect data from around the world that could be compared despite differences in language and culture.

The framework and specification for the survey were agreed internationally and both the consortium and participants submitted test questions for inclusion in the survey. After the questions were reviewed by an expert panel, countries were invited to comment on the difficulty, cultural appropriateness, and curricular and non-curricular relevance.

A field trial was carried out in every country in 2008 and the outcomes were used to finalise the contents and format of the tests and questionnaires for the main survey in 2009.

Strict international quality standards were applied to all stages of the PISA survey to ensure equivalence in translation and adaptation of instruments, sampling procedures and survey administration in all participating countries.

1.3 What PISA measures

This section briefly describes the purposes of the assessment of reading, mathematics and science in PISA 2009. Full details of the framework for the assessment of each subject are in the PISA Assessment Framework (OECD 2009).

1.3.1 Reading

Reading was the main focus in the first PISA study in 2000 and a minor domain in PISA 2003 and PISA 2006.

Reading in PISA focuses on the ability of pupils to use information from texts in situations which they encounter in their life. Reading in PISA is defined as:

> *[...] understanding, using, reflecting on and engaging with written texts, in order to achieve one's goals, to develop one's knowledge and potential, and to participate in society.*
>
> (OECD 2009)

The concept of reading in PISA is defined by three dimensions: the format of the reading material, the type of reading task or reading aspects, and the situation or the use for which the text was constructed.

The first dimension, the text format, divides the reading material or texts into *continuous* and *non-continuous* texts. *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*.

The second dimension is defined by three reading aspects: retrieval of information, interpretation of texts, and reflection on and evaluation of texts. Tasks in which pupils retrieve information involve finding single or multiple pieces of information in a text. In interpretation tasks, pupils are required to construct meaning and draw inferences from written information. The third type of task requires pupils to reflect on and evaluate texts. In these tasks, pupils need to relate information in a text to their prior knowledge, ideas and experiences.

The third dimension is that of situation or context. The texts in the PISA assessment were categorised according to their content and the intended purpose of the text. There were four situations: reading for private use (personal), reading for public use, reading for work (occupational) and reading for education.

The reading items were of three types: open constructed response, short open response or closed response (for example, multiple choice). Approximately half the questions were of the open response type, while the rest were closed response. Approximately a third were of the longer constructed type, which required pupils to develop and explain their response. Such questions were generally two or three mark questions. The remainder of the open response questions required only short answers.

1.3.2 Mathematics

Mathematics was the main focus in PISA 2003, and a minor domain in PISA 2000, PISA 2006 and PISA 2009. It will be the main subject in the next PISA survey in 2012.

PISA aims to assess pupils' ability to put their mathematical knowledge to functional use in different situations in adult life, rather than on what is taught in participating countries.

PISA defines this ability as:

> *[…] an individual's capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgements and to use and engage with mathematics in ways that meet the needs of that individual's life as a constructive, concerned and reflective citizen.*
>
> (OECD 2009)

In order to demonstrate this capacity, pupils need to have factual knowledge of mathematics, skills to carry out mathematical operations and methods, and an ability to combine these elements creatively in response to external situations.

PISA recognises the limitations of using a timed assessment in collecting information about something as complex as mathematics in this large-scale survey, particularly in the case of PISA 2009 where mathematics was a minor domain with fewer questions than for reading. It aims to tackle this by having a balanced range of questions that assess different elements of the pupil's mathematising process. Mathematising is the process where a pupil

interprets a problem as mathematical and draws on their mathematical knowledge and skills to provide a sensible solution to the problem.

PISA prefers context-based questions which require the pupil to engage with the situation and decide how to solve the problem. Most value is placed on tasks that could be met in the real world in which a person would authentically use mathematics. Some more abstract questions that are purely mathematical are also included in the PISA survey.

In the PISA 2009 survey, pupils were asked to show their responses to questions in different ways. About a third of the questions were open response, which required the pupils to develop their own responses. These questions tended to assess broad mathematical constructs. A question in this category typically accepted several different responses as correct and worthy of marks. The rest of the questions were either multiple choice or simple open response questions, with approximately the same number of each. These questions, which tended to assess lower-order skills, had only one correct response.

1.3.3 Science

Science was the main focus in PISA 2006, and a minor domain in PISA 2000, PISA 2003 and PISA 2009.

The survey aims to measure not just science as it may be defined within the curriculum of participating countries, but the scientific understanding which is needed in adult life. PISA defines this as *the capacity to identify questions, acquire new knowledge, explain scientific phenomena, and draw evidence-based conclusions about science-related issues* (OECD, 2009). Those with this capacity also understand the characteristic features of science as a form of human knowledge and enquiry; are aware of how science and technology shape their lives and environments; and are willing and able to engage in science-related issues and with the ideas of science, as a reflective citizen. Therefore, PISA assessments measure not only scientific knowledge, but also scientific competencies and understanding of scientific contexts.

Scientific knowledge constitutes the links that aid understanding of related phenomena. In PISA, while the scientific concepts are familiar (relating to physics, chemistry, biological sciences, and earth and space sciences), pupils are asked to apply them to the content of the test items and not simply to recall facts.

Scientific competencies are centred on the ability to acquire, interpret and act upon evidence. Three processes are identified in PISA: firstly, identifying scientific issues; secondly, explaining phenomena scientifically; and, thirdly, using scientific evidence.

Scientific contexts concern the application of scientific knowledge and the use of scientific processes. This covers personal, social and global contexts.

The science questions in the PISA 2009 survey were of three types: open constructed response items required pupils to write longer answers; short open response required answers of a few words; and closed response (for example, multiple choice). Approximately a third were of the longer constructed type, which required pupils to

develop and explain their response. Such questions were generally two or three mark items.

1.4 What the scales mean

PISA uses proficiency levels to describe the types of skills that pupils 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 are 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.

Pupils 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 pupils proficient at level 3 are also considered to be proficient at levels 1 and 2. The proficiency level of a pupil is the highest level at which they answer more than half of the questions correctly.

The table below shows the score points for each level in each subject.

	Below level 1	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Science	below 335	335–410	410–484	484–559	559–633	633–708	above 708
Mathematics	below 358	358–420	420–482	482–545	545–607	607–669	above 669

	Below level 1b	Level 1b	Level 1a	Level 2	Level 3	Level 4	Level 5	Level 6
Reading	below 262	262–335	335–407	407–480	480–553	553–626	626–698	above 698

Every cycle of PISA focuses on a different subject and no one pupil is presented with all PISA questions. Instead, statistical methods are used to estimate the likelihood that the pupil would be able to answer correctly the questions which they have not actually done.

The mean score for each subject scale was set to 500 among OECD countries, in the PISA cycle when the subject was the major domain for the first time. The reading 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 was set to a mean of 500 in 2006. The method by which these scales are derived is explained further in Appendix E and in the *PISA Technical Report* (OECD, forthcoming).

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.

1.5 Survey administration

The survey administration was carried out internationally on behalf of OECD by a consortium led by the Australian Council for Educational Research (ACER) (Consortium A). This consortium was responsible for the development of tests and administration manuals, decisions on sampling within countries and ensuring that all countries met rigorous quality standards. Questionnaires were developed by Consortium B, led by Cito in the Netherlands. The consortia worked with the PISA national centre within each country, through the national project manager (NPM). For England, Wales, Northern Ireland and Scotland, the National Foundation for Educational Research (NFER) was the PISA national centre.

The national centres were responsible for making local adaptations to instruments and manuals, and translation, where necessary. The NFER made appropriate adaptations to all PISA instruments and accompanying documentation. All materials were translated into Welsh and pupils in Wales were asked to choose the language in which they wished to complete tests and questionnaires.

National centres were also responsible for supplying the information necessary for sampling to be carried out. School samples were selected by Consortium A, while pupil samples within schools were selected by the NFER using software supplied by Consortium A.

Test items were organised into 13 test booklets with items repeated across booklets. Approximately half the total test items assessed reading while the others were divided between maths and science. All pupils were assessed in reading, which was the main focus of PISA 2009. Random subsamples of pupils were also assessed in mathematics and science, with approximately 70 per cent of pupils doing each subject. In addition to the tests, there were two questionnaires: one for pupils and the other for schools. All pupils completed the same questionnaire.

Tests and questionnaires were generally administered to pupils in a single session, with a two-hour testing period and approximately half an hour for completing the student questionnaire. The total length of a survey session was around three and a half hours. The survey was administered by test administrators employed by the NFER.

In each country participating in PISA, the minimum number of participating schools was 150, and the minimum number of pupils 4500. In the case of the UK, and of some other countries, the number exceeded this. In some cases, this was due to the need to over-sample some parts of the country. In the case of the UK, for example, larger samples were drawn for Wales, Scotland and Northern Ireland than would be required for a representative UK sample. This was to make it possible to provide separate PISA results for the four parts of the UK. In some countries, additional samples were drawn for other

purposes, for example, to enable reporting of results for a sub-group such as a separate language group. In very small countries with less than 150 schools the survey was done as a school census with all secondary schools included.

The pupils included in the PISA survey were generally described as 15-year-olds, but there was a small amount of leeway in this definition depending on the time of testing. In the case of England, Wales and Northern Ireland, the sample consisted of pupils aged from 15 years and three months to 16 years and two months at the beginning of the testing period.

Countries were required to carry out the survey during a six-week period between March and August 2009. However, England, Wales and Northern Ireland were permitted to test outside this period because of the problems for schools caused by the overlap with the GCSE preparation and examination period. In England, Wales and Northern Ireland the survey took place in November and December 2009.

1.6 Interpreting differences between countries

In many countries, PISA data is used to establish benchmarks for educational standards based on the performance of particularly relevant comparison countries. It may also be of interest to identify countries that have reached high levels of equity in educational outcomes. The data may provide a common platform for different countries to exchange information and ideas. However, it is important to know what can reasonably be concluded from the data and which interpretations would be going beyond what can be reliably supported by the results. This section outlines some points that need to be kept in mind while reading this report.

1.6.1 Survey procedures

PISA uses comprehensive guidelines and stringent checking procedures with the aim of guaranteeing that all data is collected in exactly the same way in every country. In practice, it is very difficult to guarantee that every aspect of the survey is carried out in exactly comparable ways across the world. When differences appear these are investigated by the PISA consortium. In cases where there is no impact on the quality of the data it is included in the overall results, although in some cases a note is attached in the international report. In cases where the difference is considered to affect the quality of the data, and to make country comparisons unhelpful, the relevant data is excluded from the overall results. Again, any such instances are reported in the international report.

1.6.2 Sources of uncertainty

There are two sources of uncertainty which have to be taken into account in the statistical analysis and interpretation of any test results. These are described as *sampling error* and *measurement error*.

Sampling error stems from the inherent variation of human populations which can never be summarised with absolute accuracy. It affects virtually all research and data collection that makes use of sampling. Only if every 15-year-old in each participating country had

taken part in PISA could it be stated with certainty that the results are totally representative of the attainment of the entire population of students in those countries. In reality the data was collected from a sample of 15-year-olds. Therefore, the results are a best estimation of how the total population of 15-year-olds could be expected to perform in these tests. There are statistical methods to measure how good the estimation is. However, it is important to recognise that all data on human performance or attitudes which is based on a sample carries a margin of error.

Measurement error relates to the results obtained by each individual pupil, and takes account of variations in their score which are not directly due to underlying ability in the subject but which are influenced by other factors related to individuals or to the nature of the tests or testing conditions.

1.6.3 Interpreting rank order

Because of the areas of uncertainty described above, interpretations of very small differences between two sets of results are often meaningless. Were they to be measured again, it could well be that the results would turn out the other way round. For this reason, this report focuses mainly on *statistically significant* differences between mean scores rather than the simple rank order of countries. Statistically significant differences are unlikely to have been caused by random fluctuations due to sampling or measurement error.

Where significant differences between countries are found, these may be the result of a great number of factors, for some of which the data was not collected in the PISA survey. Therefore, the PISA survey is only able to explain the reasons for differences between countries to a limited extent. For example, differences in school systems and educational experiences in different countries could play a part, but so could a wide range of different out-of-school experiences. It is important to bear this in mind while reading this report.

1.7 Organisation of this report

Chapter 2 gives further country-specific background to the PISA survey. Chapters 3, 4 and 5 describe PISA results for reading, mathematics and science. Chapters 6 and 7 present and discuss some of the responses to the student and school questionnaires. Chapter 8 describes and discusses the PISA results in the four constituent parts of the UK.

The international tables and figures presented in this report include the results for the UK since these are reported in all international tables. In most cases, tables and figures include results for England, Wales, Northern Ireland and Scotland since these figures are referred to in Chapter 8.

More detailed analyses of international results can be found in the OECD report on PISA 2009, which also includes results for the UK (OECD, 2010).

2 PISA in Wales

2.1 Introduction

The National Foundation for Educational Research (NFER) was contracted to carry out the PISA 2009 study in England, Wales and Northern Ireland on behalf of the Department for Children Schools and Families (DCSF – now DfE) in England, the Welsh Assembly Government (WAG) and the Department for Education in Northern Ireland (DENI). Scotland participated in the study separately. The results from all parts of the UK are reported as a single United Kingdom result in the international PISA report, with the results from the separate parts of the UK reported in an Annex.

2.2 The PISA sample

The first stage of sampling was agreement of the school stratification variables to be used for each country. Table 2.1 shows the variables which were used for sampling of schools in Wales for PISA 2009.

Table 2.1 Stratification variables for Wales

Variables	Levels	
School type	• maintained • independent	
Region	• North • Powys and South • South East	
Gender	• Male • Female • Mixed	
Local authority	North • Gwynedd • Conwy • Denbighshire • Flintshire • Wrexham	Powys and South • Powys • Ceredigion • Pembrokeshire • Carmarthenshire
	South East • Swansea • Neath Port Talbot • Bridgend • Vale of Glamorgan • Rhondda Cynon Taff • Merthyr Tydfil	 • Caerphilly • Blaenau Gwent • Torfaen • Monmouthshire • Newport • Cardiff

Countries are allowed to exempt schools from the sampling frame if it is expected that the majority of pupils would not be eligible to participate in PISA. In Wales special schools and Pupil Referral Units were excluded from the sampling frame on this basis.

Following agreement of the sampling plan and the establishment of population estimates in the age group, the list of all eligible schools and their populations was sent to the PISA Consortium. The Consortium carried out the school sampling and then sent the list of selected schools back to NFER.

The schools which had been selected in the sample were then invited to participate, and those which agreed were asked to supply details of all pupils who would be in Year 11 at the time of the beginning of the PISA survey period in November 2009. In addition, they were asked to supply details of any who were born in the relevant period but were in other year groups.

When the pupil data was obtained from schools, the Keyquest software supplied by the PISA Consortium was used to randomly select 30 pupils within each school from those who met the PISA age definition. The selection was done on the basis of date of birth.

The PISA study has strict sampling requirements regarding both the participation rate which is acceptable and the replacement of schools which decline. Within each country three separate samples are selected, the first being the main sample and the other two backup samples. In the backup samples each school is a replacement for a specific school in the main sample. So, if a main sample school declined to participate, there were two other schools which could be used as replacements for that school. In Wales, there were 152 schools in the main sample, with 68 in the first backup sample and 34 schools in the second backup sample.

School recruitment is an issue to which particular attention has to be given in PISA. According to the PISA sampling rules, an acceptable school response in the main sample would be 85 per cent. If the response from the main sample meets this percentage, replacement of non-participating schools is not necessary. If the response from the main sample is below this percentage but above 65 per cent it is still possible to achieve an acceptable response by using replacement schools from the backup samples. However, the target then moves upwards – for example, with a main sample response of 70 per cent, the after-replacement target is 94 per cent.

There is also a response rate requirement for pupils within each school. It is possible for pupils to be excluded from participation and not counted within the total because they have special needs such that they could not participate, because they have limited language skills, or because they are no longer at the school. The remaining pupils are deemed eligible for PISA participation, and at least 50 per cent of these must participate for the school to be counted as a participating school.

In Wales, a total of 132 schools took part in PISA 2009. The required pupil participation rate, of at least 50 per cent of sampled pupils, was achieved in all participating schools. The final response rate for Wales was 82.2 per cent of main sample schools, and 86.8 per cent after replacement. This fully met sampling requirements.

The international response rate for the United Kingdom is calculated based on the results for England, Wales, Northern Ireland and Scotland, with weighting according to the population in each country as well as school size. The school response rate for the England, Wales and Northern Ireland combined sample was 70.2 per cent of main sample

schools, and 87.2 per cent after replacement. This fell slightly short of the participation requirements. As the response rate was below that required, NFER was asked to provide some analysis of the characteristics of responding and non-responding schools in England, since it was here that school participation had failed to meet requirements. This showed no significant differences and it was accepted by the PISA sampling referee that there was no evidence of possible bias in the UK sample as a result of school non-participation.

The final response requirement was for the total number of participating pupils, and the target here was for 80 per cent overall. Across the UK the pupil response rate target was met with a final unweighted response rate of 87.5 per cent and a weighted response rate of 87.3 per cent. The pupil response rate for Wales was 86 per cent of sampled pupils (a total of 3270 pupils).

The tests and questionnaires were available in both English and Welsh. Translation was done by professional translators, supervised by NFER's Welsh Office. Research staff in the Welsh Office are experienced in development of Welsh language tests and curriculum materials so were able to ensure that the correct subject-specific terminology was used. The translated materials were trialled by Welsh Office researchers with pupils in a small number of schools to check understanding of the translated versions. Schools in Wales were asked if they wished each pupil to complete the survey in English or in Welsh. Pupils were not allowed to choose mixed languages – each pupil had to complete the survey in just one language. Twenty-one schools opted for Welsh for some or all of their pupils. In ten of these schools all pupils completed Welsh versions while in the other eleven schools both language versions were used. The total number of pupils who completed the Welsh versions was 340. Schools were sent both language versions of the school questionnaire. The Welsh language version was completed by 16 schools.

2.3 PISA in the context of the National Curriculum

In this section, the definitions of the three PISA subject domains and the methods of assessment in the PISA survey are compared with those included in the national curriculum in Wales. The aim is to estimate the extent to which the PISA assessments would be familiar to learners in Wales and would match the content and style of what they had been learning at school.

2.3.1 Science

PISA assesses 'scientific literacy', which is exactly what the school curriculum in Wales is trying to engender at Key Stages 2 and 3. The curriculum for Key Stage 4 was developed within the UK-wide joint agreement.

In these early days of a revised curriculum, science at Key Stage 3 is still being taught in many schools through the separate subjects (e.g. biology, chemistry and physics) and is more knowledge-based than that required to improve scientific literacy. The assessments shown in the PISA framework have some merging of the science disciplines. Learners in Wales who have been taught through separate sciences at Key Stages 3 and 4 would be more likely to struggle under these circumstances.

The programmes of study across the key stages reflect the content of the PISA framework. However, the teaching and learning in many secondary science classrooms in Wales requires further development in order to ensure learners have the confidence to apply their knowledge. Much science is still taught superficially and learners can therefore lack the understanding required to successfully apply scientific ideas. In addition, there is a strong evaluative and reflective element in PISA's expectations of 15-year-old learners. The more common traditional classroom practice will not help learners to perform in this way.

Assessment at the end of Key Stage 3 is teacher-led without external tests. Learners will have had many opportunities for summative assessments throughout their schooling. However, the PISA assessments are likely to be the first externally assessed tests they have taken. Therefore learners may well lack the skills needed to ensure they use their knowledge and understanding successfully in an externally assessed context when responding at length.

2.3.2 Mathematics

The mathematics assessment used in PISA 2009 focused on the capacity of learners to analyse, reason and communicate effectively as they pose, formulate, solve and interpret mathematical problems in a variety of situations. There is a good match between these processes and those specified in the *Skills* sections of the national curriculum programmes of study for mathematics, where problem solving, communicating and reasoning are identified as key strands. Similarities can also be drawn between the PISA concepts of *quantity, shape and space, change and relationships* and *uncertainty* and those defined in the national curriculum range, namely *number, measures and money, algebra, shape, position and movement* and *handling data*. The scope of mathematical knowledge, skills and understanding therefore appears to be similar in PISA and the national curriculum.

The demand of the PISA questions is quite high. The questions require learners to read a large amount of contextual information; probably more than is usual in any internal assessments with which learners in Wales would be familiar. For many of the Year 11 cohort in 2009/10, the PISA tests would have been the first formal external assessments that these learners experienced.

Furthermore, there are differences in the style of questions found on the PISA and GCSE assessments. The majority of the PISA questions place quite a high demand on the learners' reading skills to extract and interpret information. In contrast, GCSE questions, whilst still set in context, tend to be shorter and do not generally require as much reading and interpretation. Learners in Wales might therefore find the style and demands of the PISA test challenging, as the longer and more complex contexts would make the questions less accessible.

2.3.3 Reading Literacy at KS3 and KS4 – Welsh and English

'Reading literacy' in PISA seeks to measure a young person's ability to understand, use and reflect on a range of written texts. The main focus of the assessment is 'reading' whereas the national curriculum for both Welsh and English focuses on three attainment targets (ATs) - oracy, reading and writing.

'Reading literacy' in PISA is assessed through writing, whereas in the national curriculum for both these subjects it can also be assessed via the oracy AT.

The PISA assessment model includes multiple-choice and short constructed responses. There are no multiple choice and very few short answer questions in GCSE Welsh Language or English Language. The familiarity of learners with this method of assessment could potentially impact on their performance. There is a dearth of text books in Welsh and English that contain multiple–choice questioning.

The text types for reading in PISA 2009 consisted mainly of non-fiction texts, including non-continuous texts, such as charts, graphs, tables, maps and forms. The programmes of study for reading in Welsh and English, introduced in 2008, specify that a 'range of non-fiction and non-literary texts' should be read and therefore learners should now be well equipped to deal effectively with the texts encountered in PISA. However, the national curriculum requirements are generic and the range of texts in the PISA framework is not specified.

For Welsh, the new specification at GCSE, to be taught from 2010, places much more emphasis on non-literary texts. The specification does require candidates to study extended literary texts but the examination component concentrates entirely on transactional prose and its interaction with graphical information. This focus is in line with the PISA assessment model.

For English, the new specification at GCSE for English Language, to be taught from 2010, assesses both literary and non-literary texts in equal measure.

Expository texts formed a high percentage of the eight units of the PISA assessment. In this respect, PISA differs from English and Welsh Language GCSE which includes the study of extended literary prose as well as non-literary forms. This means that the PISA tests differ in their overall balance both from the national curriculum programme of study and at GCSE level.

The key competency document for PISA states that, 'Readers must be familiar with the use of retrieval, indexing and navigation tools for linking between texts'. ICT skills are embedded throughout the programmes of study for Welsh and English at Key Stage 3 and Key Stage 4. Learners need to have had a broad experience of ICT reading skills across the curriculum in order to access the PISA assessment.

3 Reading

3.1 Introduction

This chapter reports the attainment of pupils in Wales in reading. It draws on findings outlined in the international report (OECD, 2010a) and places outcomes for Wales in the context of those findings. The international report includes outcomes for all 65 participating countries, including the UK as a whole (outcomes for four nations of the UK are not reported separately in the international report). In this report scores for Wales are compared with 64 other countries excluding the UK. Comparisons of Wales with the three other parts of the UK has been done separately and is reported in Chapter 8.

This is the fourth PISA cycle. The first, in 2000, assessed the domain of reading as its main focus, with mathematics and science as subsidiary subjects. In 2003 and 2006, all three subjects were again assessed, with mathematics and science respectively as the main focus in each cycle. In 2009, reading became the main focus once again. PISA 2006 was the first PISA cycle in which Wales participated. Wales did not participate in PISA 2000 the last time reading was assessed as the main focus.

While findings for all countries are reported in this chapter where relevant, most findings relate to a sub-group of countries. The countries forming the comparison group include OECD countries, EU countries and other countries with relatively high scores. Since countries with very low scores are not so relevant for comparison purposes, those with a mean score for reading of less than 430 have been omitted from tables unless they are in OECD or the EU. Hence, the comparison group in this chapter for reading comprises 47 countries (of which 24 are EU members and 32 OECD members), as shown in Table 3.1.

Table 3.1 Countries compared with Wales

Australia	Finland*	*Liechtenstein*	*Russian Federation*
Austria*	France*	*Lithuania**	*Serbia*
Belgium*	Germany*	Luxembourg*	*Shanghai-China*
*Bulgaria**	Greece*	*Macao-China*	*Singapore*
Canada	*Hong Kong-China*	Mexico	Slovak Republic*
Chile	Hungary*	Netherlands*	Slovenia*
Chinese Taipei	Iceland	New Zealand	Spain*
Croatia	Israel	Norway	Sweden*
Czech Republic*	Italy*	Poland*	Switzerland
Denmark*	Japan	Portugal*	Turkey
Dubai (UAE)	Korea	Republic of Ireland*	United States
*Estonia**	*Latvia**	*Romania**	

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

In addition to the countries listed above, tables and figures in Appendix A include the data for all four parts of the United Kingdom.

Outcomes for the United Kingdom as a whole are set out in the international report (OECD, 2010a). Outcomes for Wales are derived from the international analysis carried out at 'sub-national' level (i.e. for the constituent countries within the UK), as well as from additional analysis conducted using the international dataset.

3.2 Scores in Wales

Pupils in Wales achieved a mean score of 476 in reading, which was below and significantly different statistically from the OECD mean of 493.

Internationally, the performance in reading in 29 of the other 64 participating countries was at a significantly higher level than Wales (see Table 3.2). Ten countries performed at a level that was not significantly different from that of Wales, while the remaining 25 countries performed significantly less well. Tables 3.3 and 3.4 show the comparison group countries which performed similarly to Wales, and those whose performance was lower than Wales'. Further data can be found in Appendix A1 (significant differences between Wales and the comparison group countries) and Appendix A2 (mean scores and standard errors for Wales and the comparison group countries).

It should be noted that the test of statistical significance takes into account not just the mean score but also the error of measurement. This means that Slovenia's mean score was significantly higher than that of Wales but the mean score of Latvia was not. This was in spite of the fact that Latvia's score was slightly higher than that of Slovenia. (See section 1.6 above for an explanation of how statistical significance should be interpreted in this report. Appendix E gives a more detailed account of the analysis.)

Of the 29 countries with mean scores in reading that are significantly higher than Wales', four of them are English speaking (New Zealand, Australia, United States and Republic of Ireland) and one has a substantial number of English speakers (Canada). Two other countries (Hong Kong-China and Singapore) have strong historical links with the education system of the UK.

Fourteen of the countries that significantly outperformed Wales are EU members (Finland, Netherlands, Belgium, Estonia, Poland, Sweden, Germany, Republic of Ireland, France, Denmark, Hungary, Portugal, Italy and Slovenia). Eight EU countries did not perform significantly differently from Wales and two performed less well. Among OECD countries, 22 outperformed Wales, seven performed similarly, and three performed less well.

As noted in Chapter 1, reading literacy in PISA is assessed in relation to text format (*continuous* and *non-continuous texts*) and in relation to three reading processes. The reading processes or aspects assessed are the ability to *access and retrieve* information, to *integrate and interpret* information in order to demonstrate understanding of the text and to *reflect and evaluate* form, features and purpose (see section 1.3.1 for more information). In addition to their overall performance, pupils' reading performance was analysed separately by text format and by reading aspect. In some countries, pupils showed notably stronger or weaker performance in some of these areas, relative to their mean performance. If mean scores on some subscales are lower than on others, this could have

implications for teaching and learning or might suggest that the balance of these areas in the curriculum should be evaluated.

Table 3.2 Countries outperforming Wales in reading (significant differences)

Country	Mean score	Country	Mean score
Shanghai-China	556	Iceland	500
Korea	539	United States	500
Finland*	536	*Liechtenstein*	499
Hong Kong-China	533	Sweden*	497
Singapore	526	Germany*	497
Canada	524	Republic of Ireland*	496
New Zealand	521	France*	496
Japan	520	*Chinese-Taipei*	495
Australia	515	Denmark*	495
Netherlands*	508	Hungary*	494
Belgium*	506	Portugal*	489
Norway	503	*Macao-China*	487
*Estonia**	501	Italy*	486
Switzerland	501	Slovenia*	483
Poland*	500		

Table 3.3 Countries not significantly different from Wales

Country	Mean score	Country	Mean score
*Latvia**	484	*Croatia*	476
Greece*	483	Israel	474
Spain*	481	Luxembourg*	472
Czech Republic*	478	Austria*	470
Slovak Republic*	477	*Lithuania**	468
Wales	**476**		

Table 3.4 Countries significantly below Wales

Country	Mean score	Country	Mean score
Turkey	464	*Serbia*	442
Dubai (UAE)	459	*Bulgaria**	429
Russian Federation	459	Mexico	425
Chile	449	*Romania**	424
		plus 17 other countries	

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

In relation to text format, Wales achieved a higher mean score on the *non-continuous texts* scale (486) than on the *continuous texts* scale (474). Wales' highest reading process score was attained on the *reflect and evaluate* subscale, with a mean of 483, seven scale points higher than its overall mean for reading (476). Wales scored a mean of 477 on the *access and retrieve* scale and 472 on the *integrate and interpret* scales. The differences are not

large and the statistical significance is not currently available, but this may suggest that, in Wales, pupils tend to be more skilled at making judgements about authorial techniques and determining the usefulness of a text for a particular purpose and relatively less skilled at using inference and deduction and linking ideas within or across texts (*integrate and interpret*). The statistical significance of these differences was not tested.

A similar level of variation was seen in several other countries (see Appendix A3). Many of the 29 countries which significantly outperformed Wales did not have consistent performance across the three reading processes and the two text formats (see Table 3.5). This was true even for some of the highest performing countries in this group. For example, Shanghai-China scored 16 scale points lower than its mean on *non-continuous texts* but eight points higher on *continuous texts*. Hong Kong-China showed the same trends, to a less pronounced degree. Conversely, both Singapore and New Zealand, and to a lesser extent Australia, had higher mean scores for the *non-continuous texts* scales relative to their overall means.

Appendices A4 to A8 show the mean scores for each comparison group country on each of the five subscales, while Appendices A9 to A13 summarise the statistically significant differences for these scales.

3.3 Differences between highest and lowest attainers

In addition to knowing how well pupils in Wales performed overall and across the different subscales assessed, it is also important for teaching and learning purposes to examine the spread in performance between the highest and lowest achievers. Amongst countries with similar mean scores there may be differences in the numbers of high- and low-scoring pupils. A country with a wide spread of attainment may have large numbers of pupils who are underachieving as well as pupils performing at the highest levels. A country with a lower spread of attainment may have fewer very high achievers but may also have fewer underachievers.

The first way in which the spread of performance in each country can be examined is by looking at the distribution of scores. Appendix A2 shows the average score of pupils at each percentile and the size of the difference between the highest and lowest attainers (at the 5th and 95th percentiles) on the reading scale overall in each country.

The 5th percentile is the score at which five per cent of pupils score lower, while the 95th percentile is the score at which five per cent score higher. This a better measure for comparing countries than using the lowest and highest pupils. Such a comparison may be affected by a small number of pupils in a country with unusually high or low scores. Comparison of the scores at the 5th and the 95th percentiles gives a much better indication of the typical spread of attainment.

The mean score of pupils in Wales at the 5th percentile was 319 while the score of those at the 95th percentile was 626, a difference of 307 scale points. This was similar to the OECD average difference, which was 305 scale points. Eighteen of the comparison group countries had wider distributions of scores than Wales. These were 15 OECD countries

Table 3.5 Differences between scale scores in countries outperforming Wales

		Difference from overall reading mean				
		Reading aspect			Text format	
	Overall reading mean	*access and retrieve*	*integrate and interpret*	*reflect and evaluate*	*continuous text*	*non-continuous text*
Shanghai-China	556	-7	2	1	8	-16
Korea	539	2	1	3	-1	3
Finland*	536	-4	2	0	-1	-1
Hong Kong-China	533	-4	-3	6	5	-11
Singapore	526	0	-1	3	-4	13
Canada	524	-8	-2	11	0	3
New Zealand	521	0	-4	10	-3	11
Japan	520	10	0	1	1	-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	-6
*Estonia**	501	2	-1	2	-4	11
Switzerland	501	5	1	-3	-2	5
Poland*	500	0	2	-3	2	-5
Iceland	500	6	2	-4	0	-1
United States	500	-8	-5	12	0	3
Liechtenstein	499	8	-2	-2	-5	7
Sweden*	497	7	-3	5	2	0
Germany*	497	3	3	-6	-2	0
Republic of Ireland*	496	2	-2	7	1	1
France*	496	-4	2	0	-4	3
Chinese-Taipei	495	1	4	-2	1	5
Denmark*	495	7	-3	-2	1	-2
Hungary*	494	7	2	-5	3	-7
Portugal*	489	-1	-3	7	3	-1
Macao-China	487	6	2	-6	1	-6
Italy*	486	-4	4-	4	3	-10
Slovenia*	483	6	6	-13	1	-7
Wales	**476**	**1**	**-4**	**7**	**-2**	**10**

OECD countries (not italicised)
Countries not in OECD (italicised)
*EU countries

(Israel, France, Luxembourg, New Zealand, Belgium, Japan, Austria, Australia, Sweden, United States, Iceland, Greece, Italy, Republic of Ireland and Switzerland) and three non-OECD countries (Bulgaria, Dubai (UAE), and Singapore). Twenty-eight countries in the comparison groups had narrower distributions of scores indicating less spread of attainment in reading.

The second way of examining the spread of attainment is by looking at Wales' performance at each of the PISA proficiency levels. As explained in Chapter 1, reading attainment is described in terms of seven levels of achievement. These seven performance levels are outlined in Table 3.6. Also shown in this figure are the cumulative percentages at each level for the OECD average and for Wales. In all but one PISA country (Liechtenstein) there were some pupils at or below the lowest level of achievement (level 1b) and in most countries at least some pupils achieved the highest level (level 6). Full information on the proportion of pupils at each level in all comparison countries is in Appendices A14 and A15.

Table 3.6 shows that the proportion of pupils in Wales at some of the reading proficiency levels was different from the OECD average. The table in Appendix A15 shows the proportion at each level in all comparison countries.

In Wales, 1.4 per cent of pupils scored below PISA level 1b, compared with an OECD average of 1.1 per cent. At level 1a or below, Wales had 23.0 per cent, compared with an OECD average of 18.8 per cent. The proportion at level 1a or below is above the OECD average. In all, 34 countries had fewer pupils at level 1a and below than Wales. Compared with the highest-scoring countries Wales has a relatively long tail of underachievement.

At the highest reading proficiency level, 0.6 per cent of Wales' pupils achieved PISA level 6, compared to an OECD average of 0.8 per cent. Wales also had fewer pupils in the top two levels with 5.0 per cent compared to an OECD average of 7.6 per cent at level 5 or above. The numbers of pupils scoring at these high levels do not compare well with some of the highest-scoring countries. In the comparison group 29 countries had a higher percentage of pupils in the two top levels compared with Wales, ranging from 19.5 per cent (Shanghai-China) to 5.1 per cent (Czech Republic). However, of the 10 countries whose scale score for reading was not significantly different from that of Wales only four had a greater percentage of pupils in the top two levels (Israel, Luxembourg, Greece and the Czech Republic).

Findings presented earlier showed that Wales' pupils performed somewhat inconsistently across the reading aspects subscales and the text format subscales. We might expect to see a similar pattern of achievement for each subscale at each proficiency level. Table 3.7 shows the percentage of pupils in Wales at each level for each reading subscale. The proficiency distribution reflects that seen for reading overall, in that Wales has slightly higher percentages of pupils at the higher proficiency levels in the *reflect and evaluate* and *non-continuous texts* subscales. For example, in the top two proficiency levels there were 6.8 per cent of pupils in the *reflect and evaluate* subscale and 6.9 per cent in the *non-continuous texts* subscale, compared with 5.0 per cent for reading overall.

Table 3.6 PISA reading proficiency levels

Level	% at this level		What students can typically do at each level
	OECD	Wales	
6	0.8% perform tasks at level 6	0.6% perform tasks at level 6	Tasks at this level typically require the reader to make multiple inferences, comparisons and contrasts that are both detailed and precise. They require demonstration of a full and detailed understanding of one or more texts and may involve integrating information from more than one text. Tasks may require the reader to deal with unfamiliar ideas, in the presence of prominent competing information, and to generate abstract categories for interpretations. *Reflect and evaluate* tasks may require the reader to hypothesise about or critically evaluate a complex text on an unfamiliar topic, taking into account multiple criteria or perspectives, and applying sophisticated understandings from beyond the text. There is limited data about *access and retrieve* tasks at this level, but it appears that a salient condition is precision of analysis and fine attention to detail that is inconspicuous in the texts.
5	7.6% perform tasks at least at level 5	5.0% perform tasks at least at level 5	Tasks at this level that involve retrieving information require the reader to locate and organise several pieces of deeply embedded information, inferring which information in the text is relevant. Reflective tasks require critical evaluation or hypothesis, drawing on specialised knowledge. Both interpretative and reflective tasks require a full and detailed understanding of a text whose content or form is unfamiliar. For all aspects of reading, tasks at this level typically involve dealing with concepts that are contrary to expectations.
4	28.3% perform tasks at least at level 4	20.8% perform tasks at least at level 4	Tasks at this level that involve retrieving information require the reader to locate and organise several pieces of embedded information. Some tasks at this level require interpreting the meaning of nuances of language in a section of text by taking into account the text as a whole. Other interpretative tasks require understanding and applying categories in an unfamiliar context. Reflective tasks at this level require readers to use formal or public knowledge to hypothesise about or critically evaluate a text. Readers must demonstrate an accurate understanding of long or complex texts whose content or form may be unfamiliar.
3	57.2% perform tasks at least at level 3	49.0% perform tasks at least at level 3	Tasks at this level require the reader to locate, and in some cases recognise the relationship between, several pieces of information that must meet multiple conditions. Interpretative tasks at this level require the reader to integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase. They need to take into account many features in comparing, contrasting or categorising. Often the required information is not prominent or there is much competing information; or there are other text obstacles, such as ideas that are contrary to expectation or negatively worded. Reflective tasks at this level may require connections, comparisons, and explanations, or they may require the reader to evaluate a feature of the text. Some reflective tasks require readers to demonstrate a fine understanding of the text in relation to familiar, everyday knowledge. Other tasks do not require detailed text comprehension but require the reader to draw on less common knowledge.
2	81.2% perform tasks at least at level 2	77.0% perform tasks at least at level 2	Some tasks at this level require the reader to locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. Others require recognising the main idea in a text, understanding relationships, or construing meaning within a limited part of the text when the information is not prominent and the reader must make low-level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text. Typical reflective tasks at this level require readers to make a comparison or several connections between the text and outside knowledge, by drawing on personal experience and attitudes.
1a	94.3% perform tasks at least at level 1a	93.3% perform tasks at least at level 1a	Tasks at this level require the reader to locate one or more independent pieces of explicitly stated information; to recognise the main theme or author's purpose in a text about a familiar topic, or to make a simple connection between information in the text and common, everyday knowledge. Typically the required information in the text is prominent and there is little, if any, competing information. The reader is explicitly directed to consider relevant factors in the task and in the text.
1b	98.9% perform tasks at least at level 1b	98.6% perform tasks at least at level 1b	Tasks at this level require the reader to locate a single piece of explicitly stated information in a prominent position in a short, syntactically simple text with a familiar context and text type, such as a narrative or a simple list. The text typically provides support to the reader, such as repetition of information, pictures or familiar symbols. There is minimal competing information. In tasks requiring interpretation the reader may need to make simple connections between adjacent pieces of information.

Table 3.7 Percentage at each level in Wales for each reading competency scale

Scale	Below level 1b	Level 1b	Level 1a	Level 2	Level 3	Level 4	Level 5	Level 6
Reading overall	1.4%	5.4%	16.3%	28.0%	28.2%	15.8%	4.4%	0.6%
access and retrieve	2.1%	5.6%	15.2%	26.3%	29.0%	16.0%	5.0%	0.8%
integrate and interpret	1.5%	6.1%	17.8%	27.6%	26.7%	14.9%	4.7%	0.6%
reflect and evaluate	1.4%	5.4%	15.1%	26.1%	28.0%	17.2%	5.7%	1.1%
continuous text	1.5%	6.0%	16.6%	27.8%	27.1%	15.9%	4.5%	0.6%
non-continuous text	1.4%	5.2%	13.9%	26.0%	28.1%	18.5%	6.0%	0.9%

3.4 Differences between boys and girls

Of the 64 other participating countries, all had a statistically significant difference in gender performance on the reading scale, favouring girls (see Appendix A2).

In Wales, there was a difference of 27 scale points between girls and boys, compared to an OECD average of 39 scale points. This difference was one of the lowest among the comparison countries, with only Belgium, Mexico, United States, the Netherlands and Chile having a smaller difference than Wales. Among OECD countries, Finland had the largest difference (55 scale points) and among the non-OECD comparison countries the largest difference was a 61-point difference in Bulgaria.

The gender difference in Wales was fairly evenly distributed across the different subscales for reading. There was a slightly larger difference of 33 scale points for *access and retrieve* and differences of 31 points and 24 points respectively on the *reflect and evaluate* and *integrate and interpret* subscales. The difference between boys and girls for both *continuous texts* and *non-continuous texts* was 28 scale points.

In line with Wales, in the majority of comparison group countries, the difference in performance between boys and girls on the *integrate and interpret* subscale was generally smaller than differences on the *access and retrieve* and *reflect and evaluate* subscales (see Appendices A4, A5 and A6). The OECD mean difference on the *integrate and interpret* scale was 36 points. This indicates that boys were relatively strong in skills such as recognising relationships between ideas, drawing inferences and making links between different parts of a text in order to identify the main theme and relatively weak on skills such as locating and selecting specific information and on drawing on external evidence in order to make judgements about texts.

For the other two reading aspect subscales (*access and retrieve* and *reflect and evaluate*), the pattern of gender difference seen in Wales was reversed for most of the comparison

countries. In Wales there was a larger difference between boys and girls on the *access and retrieve* scale, while in most other countries the gender difference was larger on the *reflect and evaluate* subscale.

It is interesting to note that in Wales the size of the gender difference was the same on the *continuous texts* and *non-continuous texts* subscales. In all of the comparison countries (with the exception of Belgium) the gender difference was larger on the *continuous texts* subscale.

In recent years, there has been a push in Wales to close the gender gap and improve the reading attainment of boys. It is therefore encouraging that the difference between boys and girls in reading, albeit significant, is less than that in many other countries.

3.5 Summary

Wales' performance in reading was significantly below the OECD average. The difference between average scale score points of the lowest scoring pupils and the highest scoring pupils in Wales was very similar to the OECD average and was smaller than the spread in some of the OECD countries. However, the proportion of pupils at each level of achievement differed from the OECD average, with higher proportions of pupils in Wales at the lower levels and lower proportions at the higher levels of achievement.

Girls scored significantly higher than boys, 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.

4 Mathematics

4.1 Introduction

This chapter explores attainment in mathematics. It draws on findings outlined in the international report (OECD, 2010a) and places outcomes for Wales in the context of those findings. The international report includes outcomes for 65 participating countries, including the UK as a whole. In this chapter, scores for Wales are compared with the 64 other countries (excluding the UK). Comparisons between Wales, England, Northern Ireland and Scotland are reported in Chapter 8.

Mathematics was a minor domain in the PISA 2009 survey. This means that only approximately 70 per cent of the pupils who took part were assessed in this subject, and that the mathematics questions did not cover the subject as fully as in reading which was the major domain. The results reported for mathematics are estimates for the whole population of 15-year-olds in Wales, based on the performance of pupils who were presented with mathematics test items. These estimates take into account information about how pupils with specific characteristics performed. The characteristics cover a wide range of variables from the student questionnaires. The scores reported in this chapter therefore give a general estimate of the performance in mathematics of 15-year-olds in Wales, rather than the fuller more rigorous assessment which is available for reading. See OECD (forthcoming) for full details of the analysis of minor domains in PISA and the method used in estimating scores on the basis of pupil characteristics.

While findings for all countries are reported in this chapter where relevant, most findings relate to a sub-group of countries. The countries forming the comparison group include OECD countries, EU countries and other countries with relatively high scores. Since countries with very low scores are not so relevant for comparison purposes, those with a mean score for mathematics of less than 430 have been omitted from tables unless they are in the OECD or the EU. This results in a comparison group of 48 countries as follows:

Australia	Greece*	Norway
Austria*	*Hong Kong-China*	Poland*
Azerbaijan	Hungary*	Portugal*
Belgium*	Iceland	Republic of Ireland*
*Bulgaria**	Israel	*Romania**
Canada	Italy*	*Russian Federation*
Chile	Japan	*Serbia*
Chinese Taipei	Korea	*Shanghai-China*
Croatia	*Latvia**	*Singapore*
Czech Republic*	*Liechtenstein*	Slovak Republic*
Denmark*	*Lithuania**	Slovenia*
Dubai (UAE)	Luxembourg*	Spain*
*Estonia**	*Macao-China*	Sweden*
Finland*	Mexico	Switzerland

France*	Netherlands*	Turkey
Germany*	New Zealand	United States

OECD countries (not italicised)
Countries not in OECD (italicised)
*EU countries

Outcomes for the United Kingdom as a whole are set out in the international report (OECD, 2010a). Outcomes for Wales are derived from the international analysis carried out at 'sub-national' level (i.e. for the constituent countries within the UK), as well as from additional analysis conducted using the international dataset.

4.2 Scores in Wales

Wales' pupils achieved a mean score of 472 for mathematics, which was statistically lower than the OECD average of 496.

Thirty-five countries performed at a level significantly higher than Wales. In three countries, mathematics attainment was not significantly different from that of Wales, while 26 countries performed significantly less well. Table 4.1 below shows the countries which significantly outperformed Wales. Table 4.2 shows the countries whose performance was not significantly different from that of Wales while Table 4.3 shows the comparison countries which were significantly lower. (See section 1.6 above for an explanation of how statistical significance should be interpreted in this report. Appendix E gives a more detailed account of the analysis.)

Of the 35 countries with mean scores significantly above Wales, only eight (Shanghai-China, Singapore, Hong Kong-China, Chinese Taipei, Liechtenstein, Macao-China, Estonia and Latvia) are not OECD countries. Two EU countries (Bulgaria and Romania) had a mean score significantly below that of Wales.

Full data can be found in Appendices B1 and B2.

4.3 Differences between highest and lowest attainers

It is important for teaching and learning purposes to know how wide the variation in performance was in Wales. Countries with similar mean scores may nevertheless have differences in the numbers of high or low attainers.

The first way in which the spread of performance in each country can be examined is by looking at the distribution of scores. Appendix B2 shows the average score of pupils at each percentile and the size of the difference between the highest and lowest attainers (at the 5th and 95th percentiles) on the mathematics scale in each country. The 5th percentile is the score at which five per cent of pupils score lower, while the 95th percentile is the score at which five per cent score higher. This a better measure for comparing countries than using the lowest and highest-scoring pupils. Such a comparison may be affected by a small number of pupils in a country with unusually high or low scores. Comparison of the

Table 4.1 Countries outperforming Wales in mathematics (significant differences)

Country	Mean score	Country	Mean score
Shanghai-China	600	Denmark*	503
Singapore	562	Slovenia*	501
Hong Kong-China	555	Norway	498
Korea	546	France*	497
Chinese Taipei	543	Slovak Republic*	497
Finland*	541	Austria*	496
Liechtenstein	536	Poland*	495
Switzerland	534	Sweden*	494
Japan	529	Czech Republic*	493
Canada	527	Hungary*	490
Netherlands*	526	Luxembourg*	489
Macao-China	525	United States	487
New Zealand	519	Republic of Ireland*	487
Belgium*	515	Portugal*	487
Australia	514	Spain*	483
Germany*	513	Italy*	483
*Estonia**	512	*Latvia**	482
Iceland	507		

Table 4.2 Countries not significantly different from Wales

Country	Mean score	Country	Mean score
Lithuania*	477	Russian Federation	468
Wales	**472**	Greece*	466

Table 4.3 Countries significantly below Wales

Country	Mean score	Country	Mean score
Croatia	460	*Bulgaria**	428
Dubai (UAE)	453	*Romania**	427
Israel	447	Chile	421
Turkey	445	Mexico	419
Serbia	442		
Azerbaijan	431	*plus 16 other countries*	

OECD countries (not italicised)
Countries not in OECD (italicised)
*EU countries

scores at the 5th and the 95th percentiles gives a much better indication of the typical spread of attainment.

Wales' mean score at the 5th percentile was 336 while its mean score at the 95th percentile was 607, a difference of 271 scale points. This was lower than the OECD average difference, which was 300 scale points. Of the 48 comparison countries seven had a smaller difference to that of Wales between the highest and lowest percentiles (Finland, Chile, Estonia, Romania, Latvia, Mexico and Azerbaijan). This indicates that Wales is among those countries where there is a small difference between the highest-attaining and the lowest-attaining pupils. This contrasts with Wales' performance in science which, as reported in the next chapter, has a wider score distribution than most PISA countries.

The second way of examining the spread of attainment is by looking at performance on each of the six PISA proficiency levels. These levels are outlined in Appendix B3. In all PISA countries there were some pupils at or below the lowest level of achievement (level 1), while in most countries (including all the comparison countries) at least some pupils achieved the highest level (level 6). See Appendices B4 and B5 for details of the proportions at each level in all comparison countries.

In Wales, 8.4 per cent of pupils scored below PISA level 1, which was slightly more than the OECD average of 8.0 per cent. (See Appendices B4 and B5). The OECD average for the proportion of pupils at level 1 or below, was 22.0 per cent. Wales has 26.2 per cent of pupils at these levels. At the highest level the OECD average is 3.1 per cent, compared to only 0.6 per cent in Wales. Looking at the top three levels combined, Wales is again below the OECD average with 19.3 per cent of pupils compared with an OECD average of 31.6 per cent.

4.4 Differences between boys and girls

Of the 64 other participating countries, 39 had a statistically significant difference in gender performance, in 34 countries favouring boys and in five (Albania, Kyrgyzstan, Lithuania, Qatar and Trinidad and Tobago) favouring girls. In Wales, there was a significant difference favouring boys. The difference of 20 scale points between girls and boys was higher than the OECD average of 12 scale points. This was one of the highest differences within the 48 comparison countries with only three countries having a higher figure (see Appendix B2). These countries were Chile, Belgium and Liechtenstein, which had 21, 22 and 24 points difference, respectively.

It was not the case that countries with the highest overall mean scores necessarily had the lowest gender differences. Of the 35 countries that performed significantly better than Wales, 20 showed a significant gender difference in the mathematics scores, favouring boys.

This gender difference is not totally in line with that found in other measurements of mathematics attainment in Wales. At GCSE for both mathematics and additional mathematics, no gender differences were shown in the August 2010 results. For example,

of the 38,192 pupils who sat a GCSE in mathematics, 14.9 per cent of boys achieved grade A* or A compared to 14.1 per cent of girls.

4.5 Summary

Wales performed below the OECD average in the mathematics domain of PISA 2009. Seventy-four per cent of pupils achieved level 2 or above which is what PISA describes as

> *... a baseline level of mathematics proficiency at which students begin to demonstrate the kind of ... skills that enable them to actively use mathematics, which are considered fundamental for future development and use of mathematics. (OECD 2007)*

Unlike in science, in mathematics Wales had a relatively low difference between the score points of the lowest-scoring pupils and the highest-scoring pupils compared with other countries. Compared with the top performing countries in the world Wales was lacking in high achievers in mathematics.

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, Wales did have one of the biggest gender differences. There did not seem to be any clear relationship between a country's mean score and whether it had a low or a high gender difference. This gender difference does not generally appear in GCSE examinations in Wales.

5 Science

5.1 Introduction

This chapter explores attainment in science. It draws on findings outlined in the international report (OECD, 2010a) and places outcomes for Wales in the context of those findings. There are 65 countries in PISA, including the UK. The international report includes outcomes for all 65 participating countries. In this report, the scores for Wales are compared with the 64 other countries, excluding the UK. Comparison of Wales with the three other parts of the UK is reported in Chapter 8.

Science was a minor domain in the PISA 2009 survey. This means that only approximately 70 per cent of the pupils who took part were assessed in this subject, and that the science questions did not cover the subject as fully as in reading which was the major domain. The results reported for science are estimates for the whole population of 15-year-olds in Wales, based on the performance of pupils who were presented with science test items. These estimates take into account information about how pupils with specific characteristics performed. The characteristics cover a wide range of variables from the student questionnaires. The scores reported in this chapter therefore give a general estimate of the performance in science of 15-year-olds in Wales, rather than the fuller more rigorous assessment which is available for reading. See OECD (forthcoming) for full details of the analysis of minor domains in PISA and the method used in estimating scores on the basis of pupil characteristics.

While findings for all countries are reported in this chapter where relevant, most findings relate to a sub-group of countries. The countries forming the comparison group include OECD countries, EU countries and other countries with relatively high scores. Since countries with very low scores are not so relevant for comparison purposes, those with a mean score for science of less than 430 have been omitted from tables unless they are in OECD or the EU. This results in a comparison group of 47 countries as follows:

Australia	*Hong Kong-China*	Poland*
Austria*	Hungary*	Portugal*
Belgium*	Iceland	Republic of Ireland*
*Bulgaria**	Israel	*Romania**
Canada	Italy*	*Russian Federation*
Chile	Japan	*Serbia*
Chinese Taipei	Korea	*Shanghai-China*
Croatia	*Latvia**	*Singapore*
Czech Republic*	*Liechtenstein*	Slovak Republic*
Denmark*	*Lithuania**	Slovenia*
Dubai (UAE)	Luxembourg*	Spain*
*Estonia**	*Macao-China*	Sweden*
Finland*	Mexico	Switzerland
France*	Netherlands*	Turkey
Germany*	New Zealand	United States
Greece*	Norway	

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

In addition to the countries listed above, tables and figures in Appendix C include the data for all four parts of the United Kingdom.

Outcomes for the United Kingdom as a whole are set out in the international report (OECD, 2010a). Outcomes for Wales are derived from the international analysis carried out at 'sub-national' level (i.e. for the constituent countries within the UK), as well as from additional analysis conducted using the international dataset.

5.2 Scores in Wales

Pupils in Wales achieved a mean score of 496 for science, not significantly different from the OECD average of 501, placing Wales in the middle ranks of achievement.

Internationally, 20 countries performed at a level significantly higher than Wales. In 15 countries, science attainment was not significantly different from that of Wales, while the remaining 29 out of a total of 64 countries performed significantly less well. Table 5.1 below shows the countries which significantly outperformed Wales. Table 5.2 shows the countries whose performance was not significantly different from that of Wales while Table 5.3 shows the comparison countries which were significantly lower. (See section 1.6 above for an explanation of how statistical significance should be interpreted in this report. Appendix E gives a more detailed account of the analysis).

Of the 20 countries with mean scores significantly above Wales, eight are EU members. There were 12 EU countries that did not perform significantly differently from Wales, but only four performed less well. Among OECD countries, 13 outperformed Wales, 13 performed similarly, and six performed less well.

More information can be found in Appendix C1, which summarises significant differences in attainment between Wales and the comparison group countries, while Appendix C2 gives mean scores with standard errors for these countries.

Table 5.1 Countries outperforming Wales in science (significant differences)

Country	Mean score	Country	Mean score
Shanghai-China	575	Netherlands*	522
Finland*	554	*Chinese Taipei*	520
Hong Kong-China	549	Germany*	520
Singapore	542	*Liechtenstein*	520
Japan	539	Switzerland	517
Korea	538	Slovenia*	512
New Zealand	532	*Macao-China*	511
Canada	529	Poland*	508
*Estonia**	528	Republic of Ireland*	508
Australia	527	Belgium*	507

Table 5.2 Countries not significantly different from Wales

Country	Mean score	Country	Mean score
Hungary*	503	Sweden*	495
United States	502	Austria*	494
Czech Republic*	500	*Latvia**	494
Norway	500	Portugal*	493
Denmark*	499	*Lithuania**	491
France*	498	Slovak Republic*	490
Wales	**496**	Italy*	489
Iceland	496	Spain*	488

Table 5.3 Countries significantly below Wales

Country	Mean score	Country	Mean score
Croatia	486	Chile	447
Luxembourg*	484	*Serbia*	443
Russian Federation	478	*Bulgaria**	439
Greece*	470	*Romania**	428
Dubai (UAE)	466	Mexico	416
Israel	455	*plus 15 other countries*	
Turkey	454		

OECD countries (not italicised)
Countries not in OECD (italicised)
*EU countries

5.3 Differences between highest and lowest attainers

It is important for teaching and learning purposes to know the spread of attainment between the highest- and lowest-scoring pupils. Countries with similar mean scores may nevertheless have differences in the numbers of high or low attainers. A country with a wide spread of attainment may have a long tail of underachievement as well as pupils who are achieving at the highest levels. A country with a lower spread may have fewer very high achievers but may also have fewer underachievers.

The first way in which the spread of performance in each country can be examined is by looking at the distribution of scores. Appendix C2 shows the average score of pupils at each percentile and the size of the difference between the highest and lowest attainers (at the 5th and 95th percentiles) on the science scale in each country.

The 5th percentile is the score at which five per cent of pupils score lower, while the 95th percentile is the score at which five per cent score higher. This a better measure for comparing countries than using the lowest and highest pupils. Such a comparison may be affected by a small number of pupils in a country with unusually high or low scores. Comparison of the scores at the 5th and the 95th percentiles gives a much better indication of the typical spread of attainment.

The average score of pupils in Wales at the 5th percentile was 336 while the score of those at the 95th percentile was 655, a difference of 318 scale points to the nearest whole scale point. This was larger than the OECD average difference of 308 scale points and only 18 countries had a wider distribution than Wales, although only 15 of these countries are comparison group countries. These were the OECD countries New Zealand, Israel, Luxembourg, Belgium, France, Australia, Austria, Germany, Sweden, Japan, the United States and the Czech Republic but also Bulgaria, Dubai (UAE) and Singapore from the non-OECD comparison countries.

The second way of examining the spread of attainment is by looking at Wales' performance at each of the PISA proficiency levels. The PISA proficiency levels are devised by the PISA consortium and are not linked to National Curriculum levels in Wales. PISA science attainment is described in terms of six levels of achievement. (See Appendix C3 for a full description of typical performance at each of these six levels.) In all PISA countries there were some pupils at or below the lowest level of achievement (level 1), while in most countries at least some pupils achieved the highest level (level 6). See Appendices C4 and C5 for details.

In Wales, 4.8 per cent of pupils scored below PISA level 1, while the OECD average was 5.0 per cent (see Appendices C4 and C5). At level 1 or below, the OECD average was 18.0 per cent compared with 18.7 per cent in Wales. The proportion of Welsh pupils in the highest level is 1.0 per cent compared with an OECD average of 1.1 per cent. When the top two levels are combined, Wales is again similar to the OECD average with 7.7 per cent compared with an OECD average of 8.5 per cent. This examination of the spread of attainment in science shows that Wales compares well with the OECD average.

5.4 Differences between boys and girls

Of the 64 other participating countries that were reported, 32 had a statistically significant difference in gender performance on the science scale, 11 favouring boys and 21 favouring girls. In Wales, there was a significant difference favouring boys. The difference of nine scale points between girls and boys was higher than the OECD average. However, many of the high-achieving countries did have gender differences. For instance, Finland had a significant gender difference of 15 points in favour of girls.

It is hard to make comparisons with GCSE science performance of boys and girls because of the range of science subjects on offer at GCSE. Pupils are able to sit science, additional science or the separate sciences of biology, chemistry and physics at GCSE. The provisional Wales science results from June 2010 show that on the whole boys and girls perform similarly with girls tending to slightly outperform boys, but there are bigger differences for biology, where girls tend to do better, and for physics, where boys tend to do better (www.jcq.org.uk).

5.5 Summary

Wales' performance in science was not significantly different from the OECD average, putting Wales in the middle ranks of achievement. Wales had a relatively large difference between the score points of the lowest-scoring pupils and the highest-scoring pupils compared with other PISA countries generally, although other comparison countries had similar or larger score distributions. The proportion of pupils with the lowest and highest levels of attainment in Wales was similar to the OECD average.

Performance by gender was variable across the countries that participated. In Wales there was a significant difference in gender performance on the science scale, favouring boys.

6 Schools

6.1 Introduction

This chapter draws on responses in Wales to the school and student questionnaires to describe aspects of school management, school climate, assessment practices and school resources. In this chapter, responses in Wales are discussed in relation to the average in other OECD countries. Comparisons with the other parts of the UK are summarised in Chapter 8.

6.2 School management

The School Questionnaire asked about responsibility for aspects of school management.

Table 6.1 summarises the responses of headteachers in Wales and shows a high degree of school autonomy, since headteachers reported that a high level of responsibility for most aspects lay within the school. The aspects on which headteachers reported the most involvement of bodies external to the school – i.e. local or national government – were in establishing starting salaries, formulating the school budget and deciding on pupil admissions. However, even for these aspects the headteacher was still considered to have more responsibility.

Teachers were reported as having a large amount of responsibility for more instructional or classroom-related issues such as discipline policies, choosing textbooks and courses and establishing assessment policies. Responses also show considerable involvement of school governing bodies in all aspects of the school, with the exception of choosing textbooks, deciding course content and deciding on budget allocations within the school.

Table 6.1 School autonomy

Regarding your school, who has a considerable responsibility for the following tasks?

	Head	*Teachers*	*School governing body*	*Local or regional authority*	*National education authority*
Selecting teachers to recruit	98%	24%	91%	15%	-
Dismissing teachers	88%	-	92%	36%	4%
Establishing teachers' starting salaries	69%	-	62%	40%	27%
Determining teachers' salary increases	74%	1%	81%	19%	28%
Formulating the school budget	82%	2%	83%	46%	8%
Deciding on budget allocations within the school	97%	18%	5%	1%	1%
Establishing student disciplinary policies	98%	67%	79%	9%	4%
Establishing student assessment policies	96%	80%	56%	8%	8%
Approving students for admission to the school	62%	8%	28%	61%	4%
Choosing which textbooks are used	9%	100%	-	-	1%
Determining course content	25%	98%	7%	5%	21%
Deciding which courses are offered	92%	83%	48%	12%	12%

A second aspect of school management which is explored in the school questionnaire is school leadership, specifically the amount of involvement which headteachers have in various activities in their school. Table 6.2 reports these responses in Wales. The activity which headteachers reported doing the least was taking over classes for absent teachers. Apart from this, they reported a high level of activity for everything.

It is interesting to contrast some of these responses with those in the international report. Table 6.2 also shows the OECD averages. These are in bold where there is a particularly large difference. There are in fact six categories where the response of headteachers in Wales was considerably higher. These are mainly related to working directly with teachers or students or to the use of student performance data in decision making. These figures suggest that headteachers in Wales take a more direct role in the day-to-day teaching and learning in their schools than do their counterparts in many other OECD countries. The PISA international report (OECD 2010d) mentions the United Kingdom as a country which was high on the 'index of educational leadership' which was based on the response to these questions. The report does not, however, suggest that this index has any direct connections with PISA scores. Some of the highest-scoring countries are also high on this index while some are much lower, so there is no clear pattern.

Table 6.2 School leadership

Below you can find statements about your management of this school. Please indicate the frequency of the following activities and behaviours in your school during the last school year.

	quite/very often	
	Wales	**OECD**
I ensure that teachers work according to the school's educational goals.	100%	93%
I ensure that there is clarity concerning the responsibility for coordinating the curriculum.	100%	99%
I make sure that the professional development activities of teachers are in accordance with the teaching goals of the school.	99%	88%
I use student performance results to develop the school's educational goals.	99%	**75%**
I pay attention to disruptive behaviour in classrooms.	97%	94%
I take exam results into account in decisions regarding curriculum development.	96%	**61%**
I check to see whether classroom activities are in keeping with our educational goals.	96%	**72%**
When a teacher brings up a classroom problem, we solve the problem together.	94%	97%
I inform teachers about possibilities for updating their knowledge and skills.	93%	89%
I observe instruction in classrooms.	93%	**50%**
When a teacher has problems in his/her classroom, I take the initiative to discuss matters.	89%	86%
I monitor students' work.	89%	**66%**
I give teachers suggestions as to how they can improve their teaching.	87%	**69%**
I take over lessons from teachers who are unexpectedly absent.	30%	29%

6.3 School climate

Information on school climate is available from questions in both the student and school questionnaires. Headteachers were asked the extent to which learning in their school is hindered by a variety of problems. These were divided into teacher-related and student-related issues. Table 6.3 shows responses, from the most frequently reported to the least.

Table 6.3 Issues that hinder learning in school

In your school, to what extent is the learning of students hindered by the following?	*to some extent/a lot*	
	Wales	**OECD**
Student-related		
Students not attending school	44%	48%
Students skipping classes	13%	**33%**
Disruption of classes by students	11%	**40%**
Students lacking respect for teachers	7%	**24%**
Student use of alcohol or illegal drugs	4%	8%
Students intimidating or bullying other students	3%	**14%**
Teacher-related		
Staff resisting change	15%	28%
Teacher absenteeism	15%	17%
Teachers' low expectations of students	12%	22%
Teachers not meeting individual students' needs	11%	**28%**
Students not being encouraged to achieve their full potential	3%	**23%**
Poor student-teacher relations	1%	12%
Teachers being too strict with students	1%	10%

The problems reported most frequently were students not attending school, staff resisting change and teacher absenteeism. The overall picture was more positive than the average in OECD countries, especially for the student-related issues. The OECD average percentages are shown in bold in Table 6.3 to show where these differences are particularly large. The largest difference was on reported disruption of classes by students, where the OECD average was 29 percentage points higher than Wales.

It is possible to compare the headteachers' views with pupils' reports about the climate of their school. Table 6.4 shows responses to questions on relationships with teachers. Although the questions are different, the views of headteachers do seem to be paralleled to some extent by the pupils' feelings about their teachers. These are generally very positive, although 23 per cent did not think their teachers were interested in them, and 31 per cent did not think their teachers listened to them. However, they were more positive about how well they get on with their teachers, their teachers' willingness to give them extra help when needed, and also about whether they are treated fairly. They were also more positive than their counterparts in other OECD countries on all aspects.

Table 6.4 Teacher-pupil relationships

How much do you disagree or agree with each of the following statements about teachers at your school?	*agree/strongly agree*	
	Wales	**OECD**
I get along well with most of my teachers	86%	85%
Most of my teachers are interested in my well-being	77%	66%
Most of my teachers really listen to what I have to say	69%	67%
If I need extra help, I will receive it from my teachers	88%	79%
Most of my teachers treat me fairly	84%	79%

Another aspect of pupils' attitudes to school which is explored in the student questionnaire is whether they feel they have benefited from their education. Table 6.5 shows responses on these questions. Clearly, the majority of the pupils feel that school has prepared them well for their future. The OECD average is not available for this question.

Table 6.5 Preparation for adult life

To what extent do you agree or disagree with the following statements?	
	disagree/strongly disagree
School has done little to prepare me for adult life when I leave school	79%
School has been a waste of time	93%
	agree/strongly agree
School has helped give me confidence to make decisions	83%
School has taught me things which could be useful in a job	90%

Students were also asked about discipline, specifically in their English or Welsh lessons. Table 6.6 summarises their responses.

Table 6.6 Discipline in English/Welsh classes

How often do these things happen in your English/Welsh lessons?		
		in most or all lessons
	Wales	**OECD**
Students don't listen to what the teacher says	30%	29%
There is noise and disorder	35%	32%
The teacher has to wait a long time for the students to settle down	31%	28%
Students cannot work well	17%	19%
Students don't start working for a long time after the lesson begins	22%	25%

On the one hand this appears to be a more negative picture than that given by headteachers, since only 11 per cent of headteachers thought that learning was hindered by class disruption by students. However, although the amount of indiscipline reported by pupils appears higher than this, only 17 per cent felt it meant they could not work well, so their feelings about this were perhaps closer to those of headteachers than it appears. Also, pupils were asked specifically about discipline in English or Welsh classes, while the

question in the school questionnaire was more general. Pupils' responses were similar to those of their counterparts in other OECD countries.

6.4 Resources

The school questionnaire asked about the extent to which schools had problems with lack of resources or a lack of staff. Table 6.7 summarises responses sorted by frequency. Responses are not available for the OECD average.

Table 6.7 Resources and staffing

Is your school's capacity to provide instruction hindered by any of the following issues?	
	to some extent/a lot
Staffing	
A lack of other support personnel	21%
A lack of qualified teachers of other subjects	17%
A lack of library staff	14%
A lack of qualified science teachers	8%
A lack of qualified mathematics teachers	8%
A lack of qualified English/Welsh teachers	2%
Resources	
Shortage or inadequacy of computers for instruction	43%
Shortage or inadequacy of computer software for instruction	40%
Shortage or inadequacy of library materials	37%
Shortage or inadequacy of science laboratory equipment	32%
Lack or inadequacy of internet connectivity	26%
Shortage or inadequacy of instructional materials (e.g. textbooks)	26%
Shortage or inadequacy of audio-visual resources	24%

The most frequent staffing problem was a lack of support personnel. Schools did not report very high shortages of qualified teachers. The resources most reported as inadequate were computers and computer software.

6.5 Assessment

The school questionnaire asked about uses and purposes of assessment within the school. Responses are reported in Tables 6.8 and 6.9. These figures are not currently available for other countries or for the OECD.

Table 6.8 shows that the most common form of assessment in regular use is coursework, projects and homework. Teacher-developed tests and teachers' judgemental ratings are also commonly used. Table 6.9 shows that schools use assessments for a variety of purposes. Some of these are related to the individual pupil, with the most common use being to inform parents of their children's progress. Other frequent uses are more related to school improvement and monitoring wider issues, such as the progress of the school from year to year.

Table 6.8 Use of assessment

How often are the following methods used to assess students in years 10 and 11? This only includes assessment decided on by your school.

	never	*1-5 times a year*	*at least once a month*
Commercially available standardised tests	38%	61%	1%
Teacher-developed tests	-	79%	21%
Teachers' judgemental ratings	4%	67%	29%
Student portfolios	14%	69%	17%
Student coursework/projects/homework	-	40%	60%

Table 6.9 Purposes of assessment

In your school, are assessments used for any of the following purposes for students in years 10 and 11?

	Yes
To inform parents about their child's progress	100%
To monitor the school's progress from year to year	97%
To group students for instructional purposes	94%
To identify aspects of instruction or the curriculum that could be improved	93%
To compare the school to local or national performance	91%
To compare the school with other schools	85%
To make judgements about teachers' effectiveness	82%
To make decisions about students' retention or promotion	82%

6.6 Summary

Headteachers 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. Headteachers in Wales 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 support personnel. The most frequently reported resource problems were shortages of computers and of computer software.

Schools most frequently use coursework or homework to assess pupils, although they also report frequent use of teacher-developed tests and teacher judgments. Assessments serve various purposes, with the most frequent being to inform parents. Assessment results are also commonly used for school improvement.

7 Pupils and reading

This chapter first reports on pupils' responses to questions about their reading activities and their attitudes to reading. Responses in Wales are discussed in relation to the average in other OECD countries. Comparisons with the other parts of the UK are summarised in Chapter 8.

Section 7.4 then reports on the relationship between socio-economic background and reading scores.

7.1 Do pupils enjoy reading?

Table 7.1 Time spent reading

About how much time do you usually spend reading for enjoyment?	Wales	OECD
I do not read for enjoyment	41%	37%
30 minutes or less a day	30%	30%
More than 30 minutes to less than 60 minutes a day	15%	17%
1 to 2 hours a day	10%	11%
More than 2 hours a day	4%	5%

In the student questionnaire, pupils were asked about the time they spent on reading for enjoyment. Table 7.1 reports their responses, which were very similar to the average in OECD countries. It appears from these figures that reading for pleasure is not a popular activity among this age group, since more than 40 per cent say they never do so.

Internationally, the time pupils spend on reading was positively connected to attainment in reading, but the largest difference was between those who never read for enjoyment and those who read for 30 minutes or less per day (OECD 2010c). This was also the case in Wales. The mean score for those who stated that they never read for enjoyment was 438 while the mean score for those who read for 30 minutes or less per day was 485. This is a difference of 47 points on the scale. The increase in score for those who read for more than 30 but less than 60 minutes per day was 37 points, and there was a further increase of only 7 points for those who read between one and two hours a day. It is not of course possible to determine the direction of causality – it is possible that poorer readers are less likely to enjoy reading. It does appear though that it is enjoyment of reading which has a positive connection with scores, rather than the amount of time spent reading.

Table 7.2 reports responses to specific questions about pupils' attitudes to various aspects of reading and activities connected with books and reading. This confirms that many pupils do not like to read unless they have to, with 37 per cent finding it hard to finish books and 51 per cent stating that they read only to get information. More than half the pupils would not be happy if given a book as a present, and only 32 per cent enjoy visiting a bookshop or a library. Most of these responses are again similar to the OECD average response, although pupils in Wales do appear to be slightly more negative overall.

Table 7.2 Attitude to reading

How much do you agree or disagree with these statements about reading?	*agree/strongly agree*	
	Wales	**OECD**
Negative attitudes		
I read only if I have to	44%	41%
I find it hard to finish books	37%	33%
For me, reading is a waste of time	23%	24%
I read only to get information that I need	51%	46%
I cannot sit still and read for more than a few minutes	32%	25%
Positive attitudes		
Reading is one of my favourite hobbies	25%	33%
I like talking about books with other people	31%	38%
I feel happy if I receive a book as a present	48%	46%
I enjoy going to a bookshop or a library	32%	42%
I like to express my opinions about books I have read	40%	57%
I like to exchange books with my friends	27%	36%

Internationally, attitudes to reading had a positive connection with reading scores and this was again the case in Wales. The mean score of those who were in the bottom quarter of the index of reading enjoyment was 425 while the mean score of those in the top quarter was 546. However, as with the responses on the time spent reading, the direction of cause and effect cannot be assumed. The weakest readers may have negative attitudes because they struggle with reading.

7.2 What do pupils read?

Table 7.3 Reading of text types

How often do you read these materials because you want to?	*At least several times a month*	
	Wales	**OECD**
Magazines	61%	60%
Newspapers	60%	61%
Fiction	28%	31%
Non-fiction books	18%	18%
Comic books	7%	23%

Table 7.3 shows what pupils choose to read at least several times a month, in order of popularity. The most common reading material was magazines or newspapers. They were more likely to read these than to read fiction, and even less likely to read non-fiction books. They were again very similar to the OECD average, except that comic books are much less popular in Wales than the average for the OECD.

Table 7.4 reports on pupils' online reading and shows that reading online is a more frequent activity than print reading for these pupils. The table is sorted to show which

activities are the most frequent. The percentage of pupils who report doing each activity at least several times a week has also been added to the table to make it easier to compare with the OECD average.

This shows that by far the most popular activities involve communication either through email or online chat. Pupils in Wales take part in these activities more than the OECD average. Chatting online was particularly popular, with 54 per cent reporting that they do this several times a day. It is possible that this includes use of social networking sites such as Facebook, since pupils were not asked about these specifically. It is also not possible to find out from these results the extent of use of text messaging or use of the internet on mobile phones.

Table 7.4 Online reading

How often are you involved in the following reading activities?

	Wales				Wales	OECD
	Never/ almost never	*Several times a month*	*Several times a week*	*Several times a day*	*at least several times a week*	
Chatting online (e.g. MSN®)	8%	7%	31%	54%	85%	73%
Reading emails	11%	18%	39%	32%	71%	64%
Searching online information to learn about a particular topic	12%	38%	36%	14%	50%	51%
Reading online news	29%	26%	28%	18%	46%	46%
Using an online dictionary or encyclopaedia (e.g. Wikipedia)	26%	36%	28%	10%	38%	39%
Searching for practical information online (e.g. schedules, events, tips, recipes)	27%	39%	24%	9%	33%	35%
Taking part in online group discussions or forums	60%	18%	12%	9%	21%	20%

A final aspect of reading activities is use of libraries. As reported in Table 7.2 above, only 32 per cent of pupils enjoy visiting a bookshop or library. Table 7.5 shows the percentages of pupils who never borrow books from either a public library or their school library for pleasure or for school work. These percentages are higher than the OECD average, particularly in the case of borrowing books for school work where 57 per cent of pupils never do this compared with an average of 34 per cent in the OECD as a whole.

Table 7.5 Borrowing books from the library

How often do you visit a library for the following activities?

	Never	
	Wales	**OECD**
Borrow books to read for pleasure	65%	48%
Borrow books for school work	57%	34%

7.3 What happens in the classroom?

In the student questionnaire, pupils were asked how often teachers do various activities in English lessons (for those who did the test in English) or in Welsh lessons (for those who did it in Welsh). These are reported in Table 7.6. The test booklets also included some questions on the types of text read at school and the frequency of various reading activities in school. These are reported in Tables 7.7 and 7.8.

Table 7.6 Teaching of reading

How often do the following occur in your English/Welsh lessons?	*In most or all lessons*	
	Wales	**OECD**
The teacher gives students enough time to think about their answers	66%	60%
The teacher encourages students to express their opinion about a text	62%	55%
The teacher asks students to explain the meaning of a text	60%	52%
The teacher asks difficult questions that challenge students to get a better understanding of a text	55%	59%
The teacher shows students how the information in texts builds on what they already know	50%	43%
The teacher helps students relate the stories they read to their lives	29%	33%
The teacher recommends a book or author to read	28%	36%

Table 7.6 shows that most of the classroom activities included occur more often in Wales than on average in the OECD. However teachers are slightly less likely than the OECD average to encourage pupils to relate stories to their own lives and they recommend books to read less often.

Table 7.7 Texts at school

During the last month, how often did you have to read the following types of texts for school (in the classroom or for homework)?	*At least twice*	
	Wales	**OECD**
Texts that include tables or graphs	73%	59%
Fiction (e.g., novels, short stories)	65%	60%
Information texts about writers or books	61%	53%
Texts that include diagrams or maps	59%	53%
Poetry	56%	43%
Advertising material	44%	40%
Newspaper reports and magazine articles	40%	47%
Instructions or manuals telling you how to make or do something	30%	31%

Table 7.7 shows the types of text which pupils reported reading at school at least twice in the previous month. Pupils report reading most types of text more than the OECD average, apart from newspaper reports and magazine articles and instructions or manuals. It is notable that while, as Table 7.3 reported, 60 per cent of pupils frequently choose to read newspapers and 61 per cent frequently read magazines, these are less frequently read for school.

Table 7.8 Reading activities at school

During the last month, how often did you have to do the following kinds of tasks for school (in the classroom or for homework)?	At least twice	
	Wales	***OECD***
Find information from a graph, diagram or table	79%	59%
Explain the way characters behave in a text	75%	60%
Explain the purpose of a text	65%	61%
Explain the cause of events in a text	64%	62%
Describe the way the information in a table or graph is organised	47%	36%
Explain the connection between different parts of a text (e.g. between a written part and a map)	43%	39%
Learn about the life of the writer	31%	38%
Memorise a text by heart (e.g. a poem or part of a play)	31%	25%
Learn about the place of a text in the history of literature	30%	33%

Table 7.8 shows pupils' reports of the number of times they had done various activities for school. They reported finding information from a graph, diagram or table, explaining the way characters behave and describing information in a table or graph substantially more than the OECD average. For other activities they were closer to the OECD average.

7.4 How do reading scores link with pupils' backgrounds?

This section reports on interactions between socio-economic background and reading scores. Socio-economic background in PISA is reported as the Economic, Social and Cultural Status (ESCS) Index. This 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, with a standard deviation of 1. This means that a country with a score of 0 would be at the OECD average. Higher scores are above the average, while lower scores are below the average.

Appendix D shows the PISA index of ESCS for OECD countries only, since this makes it easier to compare Wales with other countries which have a similar level of economic development.

The mean score of Wales on the ESCS index was 0.16, indicating that on average pupils in the PISA sample in Wales have a higher socio-economic status than the average across OECD countries. In general there was a gap in achievement in OECD countries between those who are highest and those who are lowest on the ESCS index, and that is also the case in Wales. Those in the bottom quarter of the ESCS index have a reading score of 443, those in the second quarter 466, in the third quarter 483 and in the top quarter 520. This compares with the overall mean score of 476.

The change in score for each unit of the index in Wales is 39 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 39 points. The OECD average is 38. This

suggests that the effects of socio-economic background are in the mid-range compared with other OECD countries.

However, to gain a true picture of 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. This shows the extent to which pupils in each country are able to overcome the predicted effects of socio-economic background. In the case of Wales, only 10 per cent of the variance in scores can be explained by socio-economic background. The OECD average is 14 per cent. In Poland, where the change in score per unit of ESCS was the same as that in Wales, the amount of variance explained was 15 per cent. This means that the more disadvantaged pupils in Wales have more chance of performing as well as their more advantaged peers than their counterparts in Poland. 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 nine per cent. This suggests that the education system in Japan is more successful at overcoming the effects of socio-economic background.

The country in which the most disadvantaged pupils have the least chance of succeeding in spite of their background is Hungary. Here, the change in the reading score per unit is 48 and the amount of variance explained is 26 per cent. Iceland, the country in which the most disadvantaged pupils have the greatest chance of success, with only six per cent of variance explained.

So, although the performance gap between the most advantaged and disadvantaged pupils is in the mid-range in Wales compared with other OECD countries, this is by no means a self-fulfilling prophecy. Pupils in Wales are relatively well able to overcome the disadvantages of their background.

7.5 Summary

More than 40 per cent of pupils report that they never read for enjoyment. Both internationally and in Wales, there was a large difference in scores between those who never read for enjoyment and those who do, even if only for a short time each day. Responses to statements measuring attitudes to reading do not generally show very positive attitudes, although attitudes of pupils in Wales were on the whole similar to the OECD average.

The most popular and frequent reading materials were magazines and newspapers. Pupils were less likely to read either fiction or non-fiction books. Here again pupils were similar to those in other OECD countries. They were, however, much less likely to read comic books than their OECD counterparts. They also borrow 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 the reading they do for school show that they reported spending more time on reading most types of text than the OECD average. In particular, they reported spending more time on reading *non-continuous texts*.

The connection between socio-economic background and reading scores was in the mid-range compared with other OECD countries. Many pupils can overcome disadvantage and achieve scores higher than predicted by their background. In some other OECD countries, this is much more difficult.

The international PISA analysis found links between enjoyment of reading and scores, although this is not necessarily consistent in all countries (OECD, 2010c). However, reading is a skill which develops with practice. This chapter gives a picture of 15-year-olds who spend little time reading for pleasure or reading books and a larger amount of time searching the internet or chatting online. While this may perhaps be inevitable in the 21st century, it has to be questioned whether it will help them develop the full range of reading skills they may need in the future.

8 PISA in the UK

8.1 Introduction

This chapter describes some of the main outcomes of the PISA survey in England, Wales, Northern Ireland and Scotland. In particular, it outlines some aspects where there were differences in attainment, in the range of attainment, or in the pattern of gender differences.

Section 8.5 compares responses to the school and student questionnaires in England, Wales and Northern Ireland.

8.2 Reading

This section compares the findings outlined in Chapter 3 with the comparable findings for the other parts of the UK.

8.2.1 Mean scores in reading

Table 8.1 summarises the mean scores for each of England, Wales, Northern Ireland and Scotland on the reading achievement scale. There were no significant differences between Scotland, Northern Ireland and England. However, the mean score in Wales was significantly lower than the other three parts of the UK.

Table 8.1 Mean scores for reading overall

	Mean	Scotland	Northern Ireland	England	Wales
Scotland	500	–	NS	NS	S
Northern Ireland	499	NS	–	NS	S
England	495	NS	NS	–	S
Wales	476	S	S	S	–

S = significantly different NS = no significant difference

On the three competency subscales, more differences emerged. Scores on these subscales are shown in Tables 8.2 to 8.4. Scotland was quite evenly matched on all three subscales. England had no differences in its scores on the *access and retrieve* or the *integrate and interpret* scales, while Northern Ireland and Wales were slightly lower on *integrate and interpret* than on the first scale. However, England, Northern Ireland and Wales all scored higher on the *reflect and evaluate* scale than they did on the other two. This suggests that in these three parts of the UK, pupils were relatively stronger on such aspects of reading as identifying authorial technique or commenting on the purpose of text than on the other reading skills, while in Scotland pupils' skills across all three aspects of reading were more constant.

Scotland's scores on the first two scales were significantly higher than those for England, but not significantly different to those in Northern Ireland. Wales was significantly lower than all other parts of the UK on all three aspects of reading.

Table 8.2 Mean scores on the access and retrieve scale

	Mean	Scotland	Northern Ireland	England	Wales
Scotland	504	–	NS	NS	S
Northern Ireland	499	NS	–	NS	S
England	491	NS	NS	–	S
Wales	477	S	S	S	–

S = significantly different NS = no significant difference

Table 8.3 Mean scores on the integrate and interpret scale

	Mean	Scotland	Northern Ireland	England	Wales
Scotland	500	–	NS	S	S
Northern Ireland	497	NS	–	NS	S
England	491	NS	S	–	S
Wales	472	S	S	S	–

S = significantly different NS = no significant difference

Table 8.4 Mean scores on the reflect and evaluate scale

	Mean	Scotland	Northern Ireland	England	Wales
Scotland	501	–	NS	NS	S
Northern Ireland	504	NS	–	NS	S
England	504	NS	NS	–	S
Wales	483	S	S	S	–

S = significantly different NS = no significant difference

Tables 8.5 and 8.6 show mean scores on the scales for continuous and non-continuous texts. In all four parts of the UK, pupils were relatively stronger on the non-continuous text scale.

Table 8.5 Mean scores on the continuous text scale

	Mean	Scotland	Northern Ireland	England	Wales
Scotland	497	–	NS	NS	S
Northern Ireland	499	NS	–	NS	S
England	492	NS	NS	–	S
Wales	474	S	S	S	–

S = significantly different NS = no significant difference

Table 8.6 Mean scores on the non-continuous text scale

	Mean	Scotland	Northern Ireland	England	Wales
Scotland	511	–	NS	NS	S
Northern Ireland	506	NS	–	NS	S
England	506	NS	NS	–	S
Wales	486	S	S	S	–

S = significantly different NS = no significant difference

8.2.2 Distribution of performance in reading

Chapter 3 showed that there was some degree of variation around the mean score for reading in all countries, as would be expected. The size of this variation indicates the extent of the gap between low- and high-attaining pupils. This can be seen by comparing the scores of pupils at the 5th percentile (low attainers) and those of pupils at the 95th percentile (high attainers).

The mean scores at the 5th and the 95th percentile and the differences between them are shown in Table 8.7. The difference between the OECD mean score at the 5th percentile and the OECD mean score at the 95th percentile was 305 scale points. The range was wider than this in all four parts of the UK, although not by a large amount. The highest difference of 315 was found in Northern Ireland.

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

Table 8.7 Scores of highest- and lowest-achieving pupils in reading

	Lowest (5th percentile)	Highest (95th percentile)	Difference
Scotland	341	650	309
Northern Ireland	336	651	315
England	334	646	312
Wales	319	626	307
OECD average	332	637	305

Full information on the distribution of performance is in Appendix A2.

8.2.3 Percentages at each level in reading

The range of achievement in each country is further emphasised by the percentages of pupils at each of the PISA proficiency levels. These percentages are summarised in Table 8.8.

They show that all parts of the UK have some pupils at the top and bottom of the achievement range, but that the percentages vary in each case. Wales had the largest percentage of pupils below level 1b, although this percentage is only slightly above the OECD average. The other three parts of the UK were also very close to the OECD average. At the other end of the scale, Wales was slightly lower than the OECD average at level 6 while the other three parts of the UK were slightly above. These differences from the OECD average are small and unlikely to be statistically significant. Looking at those in the top two levels combined and those at level 1b and below, more differences emerge. At the top two levels, Northern Ireland had 9.3 per cent, Scotland 9.2 per cent, England 8.1 per cent and Wales 5 per cent. The OECD average at these two levels was 7.6 per cent. At the other end of the scale, Scotland had 4.2 per cent at level 1b and below, Northern Ireland 4.8 per cent, England 5.1 per cent and Wales 6.8 per cent. The OECD average was 5.7 per cent. This suggests that although Wales had a slightly higher proportion of low-scoring pupils than the rest of the UK and the OECD average, there is a greater difference at the top end of the scale. Wales had fewer pupils achieving the highest levels of attainment in reading than either the other parts of the UK or the OECD average.

Full information on the percentages at each level are in Appendices A14 and A15. Full details of the expected performance at each PISA level are in Table 3.6 in Chapter 3. It should be noted that the PISA levels are not the same as levels used in any of the educational systems of the UK.

Table 8.8 Percentages at PISA reading levels

Scale	Below level 1b	Level 1b	Level 1a	Level 2	Level 3	Level 4	Level 5	Level 6
Scotland	0.8	3.4	12.0	24.9	29.2	20.4	8.0	1.2
England	1.0	4.1	13.3	24.7	28.9	19.9	7.1	1.0
Northern Ireland	0.9	3.9	12.7	23.8	27.8	21.6	7.9	1.4
Wales	1.4	5.4	16.3	28.0	28.2	15.8	4.4	0.6
OECD average	1.1	4.6	13.1	24.0	28.9	20.7	6.8	0.8

8.2.4 Gender differences in reading

There were differences between the countries, in terms of the achievement of boys and girls. Table 8.9 shows the mean scores for boys and girls and highlights differences which were statistically significant.

Table 8.9 Mean scores of boys and girls in reading

	Overall mean score	Mean score of boys	Mean score of girls	Difference
England	495	482	507	25*
Northern Ireland	499	485	513	29*
Scotland	500	488	512	24*
Wales	476	462	490	27*
OECD average	493	474	513	39*

* statistically significant difference

In all cases, girls 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. In all parts of the UK, the differences between boys and girls were not as great as those in many other countries and less than the OECD average.

Table 8.10 shows the gender differences on each of the reading subscales. In all parts of the UK, the differences are largest on the *access and retrieve* scale. This is in contrast to the OECD average, where the largest differences were on the *reflect and evaluate* scale. In the UK, as in the OECD, the smallest differences were on the *integrate and interpret* scale.

Table 8.10 Mean scores of boys and girls in the reading competencies

	Access and retrieve				Integrate and interpret				Reflect and evaluate			
	all	*boys*	*girls*	*diff.*	*all*	*boys*	*girls*	*diff.*	*all*	*boys*	*girls*	*diff.*
England	491	475	506	-30*	491	479	501	-22*	504	491	517	-26*
Northern Ireland	499	481	516	-35*	497	486	508	-23*	504	487	521	-34*
Scotland	504	486	522	-36*	500	490	510	-20*	501	488	515	-28*
Wales	477	460	494	-33*	472	460	484	-24*	483	468	498	-31*
OECD average	495	475	514	-40*	493	476	512	-36*	494	472	517	-44*

* *statistically significant difference*

8.2.5 Summary

This section has reviewed performance across the UK in reading. It shows that overall performance is similar in Scotland, England and Northern Ireland. The only significant differences between these three were that Scotland scored higher than England on the *access and retrieve* and *integrate and interpret* subscales. Scores in Wales were lower than those in the rest of the UK, and these differences were significant.

The difference between the achievement of the highest-attaining and the lowest-attaining pupils in all parts of the UK was only slightly above the OECD average. Wales had only a slightly higher number of low-attaining pupils compared to the other parts of the UK, but had fewer high-attaining pupils.

In all parts of the UK, and in common with all other PISA countries, girls outperformed boys. The gender gap was, however, smaller than that in many other countries.

8.3 Mathematics

Mathematics was a minor domain in the PISA 2009 survey. This means that not all pupils were assessed in this subject, and that the mathematics questions did not cover the subject as fully as in reading, which was the major domain. The results reported for mathematics were estimates for the whole population, based on the performance of pupils who were presented with mathematics test items. These estimates took into account information about how pupils with specific characteristics performed. The scores reported in this section therefore give a snapshot of performance in mathematics rather than the fuller

more rigorous assessment which is available for reading (see OECD (2009) for full details of the analysis of the minor domains in PISA).

8.3.1 Mean scores in mathematics

Table 8.11 shows the mean scores of England, Wales, Northern Ireland and Scotland for mathematics, along with the significances of differences between the countries. Full data can be found in Appendix B2.

Table 8.11 Mean scores for mathematics

	Mean	Scotland	England	Northern Ireland	Wales
Scotland	499	–	NS	NS	S
England	493	NS	–	NS	S
Northern Ireland	492	NS	NS	–	S
Wales	472	S	S	S	–

S = significantly different NS = no significant difference

The highest attainment for mathematics was in Scotland, followed by England and Northern Ireland. However, the scores were very close and there were no significant differences between these three. The lowest attainment was in Wales, and the mean score for Wales was significantly lower than the other three parts of the UK.

8.3.2 Distribution of performance in mathematics

Table 8.12 shows the scores of pupils in each country in the 5th and the 95th percentiles of achievement, along with the OECD average score in each of those percentiles. This shows the range of scores in each country. The table also shows the number of score points difference between the two figures. Full data can be found in Appendix B2.

Table 8.12 Scores of highest and lowest achieving pupils in mathematics

	Lowest (5th percentile)	Highest (95th percentile)	Difference
England	349	634	285
Northern Ireland	348	637	289
Scotland	348	651	302
Wales	336	607	271
OECD average	343	643	300

Table 8.12 shows that the lowest achieving pupils were in Wales where the scores at the 5th percentile were slightly lower than the OECD average. England, Northern Ireland and Scotland had similar scores at this percentile and they were slightly higher than the OECD average.

The greatest proportions of the highest-achieving pupils were in Scotland. In England and Northern Ireland the scores at the 95th percentile were similar and were slightly below the

OECD average. The lowest score at this percentile was in Wales, where the score of pupils in the 95th percentile was 36 points lower than the OECD average.

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 and the smallest in Wales.

8.3.3 Percentages at each mathematics level

Table 8.13 shows the percentages of pupils at each of the six levels of mathematics attainment, along with the percentages below level 1.

Scotland had the largest percentage at the highest levels of attainment and was similar to the OECD average at these levels. The proportions were similar in England and Northern Ireland. Wales had the lowest proportion at the higher levels, with only five per cent at the highest two levels compared with 9.9 per cent in England, 10.3 per cent in Northern Ireland and 12.3 per cent in Scotland. The OECD average at these two levels was 12.7 per cent.

At the other end of the scale, Scotland had 19.7 per cent at level 1 and below, England 19.8 per cent, Northern Ireland 21.4 per cent and Wales 26.3 per cent. This compares with an OECD average of 22 per cent.

Full data can be found in Appendices B4 and B5. Full details of the expected performance at each PISA level are in Appendix B3. It should be noted that the PISA levels are not the same as levels used in any of the educational systems of the UK.

Table 8.13 Percentages at PISA mathematics levels

	Below level 1	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	%	%	%	%	%	%	%
England	6.1	13.7	24.8	27.5	18.0	8.2	1.7
Northern Ireland	6.5	14.9	24.6	24.9	18.9	8.5	1.8
Scotland	6.2	13.5	23.5	25.5	18.9	9.1	3.2
Wales	8.4	17.9	28.4	26.1	14.3	4.4	0.6
OECD average	8.0	14.0	22.0	24.3	18.9	9.6	3.1

8.3.4 Gender differences in mathematics

Table 8.14 shows the mean scores of boys and girls, and the differences in their mean scores. Full data can be found in Appendix B2.

In all four parts of the UK, the differences between boys and girls were statistically significant with boys scoring higher. In all cases the differences were larger than the OECD average.

Table 8.14 Mean scores of boys and girls for mathematics

	Overall mean score	Mean score of boys	Mean score of girls	Difference
England	493	504	483	21*
Northern Ireland	492	501	484	17*
Scotland	499	506	492	14*
Wales	472	482	462	20*
OECD average	496	501	490	12*

** statistically significant difference*

8.4 Science

Science was a minor domain in the PISA 2009 survey. This means that not all pupils were assessed in this subject, and that the science questions did not cover the subject as fully as in reading, which was the major domain. The results reported for science were estimates for the whole population, based on the performance of pupils who were presented with science test items. These estimates took into account information about how pupils with specific characteristics performed. The scores reported in this section therefore give a snapshot of performance in science rather than the fuller more rigorous assessment which is available for reading (see OECD (2009) for full details of the analysis of minor domains in PISA).

8.4.1 Mean scores for science

Table 8.15 shows the mean scores of England, Wales, Northern Ireland and Scotland for science, along with the significances of differences between the countries. Full data can be found in Appendix C2.

Table 8.15 Mean scores for science

	Mean	England	Scotland	Northern Ireland	Wales
England	515	–	NS	NS	S
Scotland	514	NS	–	NS	S
Northern Ireland	511	NS	NS	–	S
Wales	496	S	S	S	–

S = significantly different NS = no significant difference

For science, the scores for England, Scotland and Northern Ireland were again very close with no significant differences. The lowest attainment was in Wales, and the mean score for Wales was significantly lower than the other three parts of the UK.

8.4.2 Distribution of performance in science

Table 8.16 shows the scores of pupils in each country in the 5th and the 95th percentiles of achievement, along with the OECD average score in each of those percentiles. This shows

the range of scores in each country. The table also shows the number of score points difference between the two figures. Full data can be found in Appendix C2.

Table 8.16 Scores of highest- and lowest-achieving pupils in science

	Lowest (5th percentile)	Highest (95th percentile)	Difference
England	349	673	325
Northern Ireland	341	676	335
Scotland	358	669	312
Wales	336	655	318
OECD average	341	649	308

Table 8.16 shows that Scotland had fewer low-scoring pupils than the rest of the UK, with the lowest attaining pupils, nevertheless, achieving higher scores than the lowest-attaining pupils in England, Wales and Northern Ireland. At the 95th percentile, the largest proportion of high-achieving pupils was in Northern Ireland, followed by England and Scotland. The lowest score at this percentile was in Wales, although this was still higher than the OECD average.

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 and the smallest in Scotland.

8.4.3 Percentages at each science level

Table 8.17 shows the percentages of pupils at each of the six PISA levels of science attainment, along with the percentages below level 1.

The information in this table adds to that discussed in the preceding section, and again shows that the widest spread of achievement was in Northern Ireland which had a slightly higher proportion than England and Scotland at the top two levels, but also a higher proportion below level 1. Scotland had the lowest percentage at level 1 or below, while Wales had the lowest at the highest two levels.

Full data can be found in Appendices C4 and C5. Full details of the expected performance at each PISA level are in Appendix C3. It should be noted that the PISA levels are not the same as levels used in any of the educational systems of the UK.

Table 8.17 Percentages at science levels

	Below level 1	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	%	%	%	%	%	%	%
England	3.8	11.0	22.3	28.8	22.5	9.7	1.9
Northern Ireland	4.4	12.3	21.8	28.2	21.6	9.7	2.1
Scotland	3.1	11.0	24.0	28.9	22.0	9.3	1.7
Wales	4.8	13.9	26.3	29.2	18.1	6.8	1.0
OECD average	5.0	13.0	24.4	28.6	20.6	7.4	1.1

8.4.4 Gender differences in science

Table 8.18 shows the mean scores of boys and girls, and the difference in their mean scores. Full data can be found in Appendix C2.

Table 8.18 Mean scores of boys and girls for science

	Overall mean score	Mean score of boys	Mean score of girls	Difference
England	515	520	510	10
Northern Ireland	511	514	509	5
Scotland	514	519	510	9
Wales	496	500	491	9*
OECD average	501	501	501	0

** statistically significant difference*

In all cases, boys had higher mean scores. However, the differences were not large and only reached statistical significance in Wales.

8.5 Schools and pupils

This section looks at similarities and differences in findings from the school and student questionnaires between England, Wales and Northern Ireland. Scotland is not included since detailed reporting of questionnaires in Scotland has not been undertaken by the NFER team.

8.5.1 School differences

When headteachers were asked about the management of their schools, headteachers in England and Wales responded very similarly, in contrast to principals from Northern Ireland who reported much more involvement from local and national government in formulating school budgets, deciding on teachers' starting salaries and choosing course content. In terms of school leadership, headteachers or principals from England, Wales and Northern Ireland all indicated high levels of involvement with the day-to-day running of their schools. When considering things that hindered pupil learning, headteachers in all three countries painted a better picture than the OECD averages. The issue that was seen as the greatest barrier to learning was pupils not attending school.

Headteachers and pupils responded similarly to questions about the extent to which learning is hindered by classroom disruption, suggesting that headteachers are well aware of issues that occur in their school classrooms. Pupils in England, Wales and Northern Ireland had similar responses about their relationships with teachers and their attitudes to school, and were more positive than the OECD average in all respects.

There were differences between the three countries in reported shortages in staffing and resources. Wales and Northern Ireland responded similarly, reporting higher levels of resource shortages than England, although all three countries reported higher levels of

inadequate computers and software compared with other school resources. Shortages of resources were particularly frequently reported in Wales. However, in terms of staffing, Wales and Northern Ireland again responded similarly, but reported lower levels of staffing shortages compared with England. Over a quarter of headteachers in England said that a shortage of maths teachers hindered instruction a lot or to some extent compared with eight per cent of headteachers in Wales and six per cent of principals in Northern Ireland; and 14 per cent of English headteachers had a shortage of science teachers which hindered learning, approximately double the percentage of Wales and Northern Ireland.

8.5.2 Pupil differences

Pupils' enjoyment of reading was similar in England, Wales and Northern Ireland, with around 40 per cent of pupils reporting that they never read for pleasure. This is similar to the OECD average. Attitudes towards reading and reading-related activities, such as receiving a book as a gift or enjoying going to a library, were similar across the three countries and tended to be slightly more negative than the OECD averages. The most popular reading activities were chatting online or reading emails, both of which were more popular than the OECD average.

A large proportion of pupils in all three countries reported never going to the library to borrow books for school work. Percentages in England, Wales and Northern Ireland varied between 51 and 57 per cent compared to the OECD average of 34 per cent. It is possible that this is because pupils are more likely to use the internet to find information for their school work, but responses to questions about using the internet to search for different types of information indicate that similar proportions of pupils in England, Wales and Northern Ireland use the internet to look for information compared with the OECD average. This may suggest that pupils in these three countries are less likely to read around a topic and direct their own learning compared with many of their counterparts. Pupils also reported that teachers were less likely to recommend a book to read compared with teachers in other countries.

The socio-economic scale that was constructed with student questionnaire responses shows that the gap in achievement between those lowest on the socio-economic index and those higher on the index in Wales was similar to the OECD average. The gap in achievement was larger in England, and pupils in Northern Ireland showed the greatest achievement gap between those that were highest and lowest on the index. The variance explained by socio-economic background factors was close to the OECD average for England and Northern Ireland and below the OECD average in Wales, suggesting that pupils in all three countries are relatively well able to overcome the disadvantages of their background.

8.6 Summary

In reading, the mean scores in England, Scotland and Northern Ireland were similar. The mean score of pupils in Wales was significantly lower than that in the other parts of the UK. Girls outperformed boys in all parts of the UK, as they did in every other country in

the PISA survey. The spread of attainment between the highest- and lowest-scoring pupils was similar across the UK.

In mathematics, there were, again, no significant differences between England, Scotland and Northern Ireland but the mean score in Wales was significantly lower than all three. Boys outperformed girls in all parts of the UK and this gender gap was relatively large compared with other countries. The spread of attainment was less in Wales than in the other parts of the UK.

In science, as with the other two subjects, there were no significant differences between England, Scotland and Northern Ireland but the mean score in Wales was significantly lower. Boys outperformed girls in all parts of the UK but the differences were small and reached significance only in Wales. The largest spread of attainment was in Northern Ireland.

Headteachers in England, Wales and Northern Ireland reported a lot of involvement with the day-to-day running of their schools. Principals in Northern Ireland reported higher levels of involvement from local and national government in relation to school budgeting and course content. There were differences in staffing and resource shortages, with schools in Wales and Northern Ireland having a greater shortage of resources but schools in England having more problems with staffing shortages.

The results from the pupil questionnaire tend to paint a negative picture of many pupils' reading activities in all three countries. Many are not interested in reading, partake in few reading activities for pleasure, and rarely visit a library. Pupils in Northern Ireland had the largest achievement gap between those pupils that scored highest and lowest on the socio-economic scale, followed by England. The achievement gap in Wales was close to the OECD average.

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Appendix A

A1 Significant differences in mean scores on the reading scale

	Mean score		significance
	Mean	S.E.	
Shanghai-China	556	2.4	▲
Korea	539	3.5	▲
Finland*	536	2.3	▲
Hong Kong-China	533	2.1	▲
Singapore	526	1.1	▲
Canada	524	1.5	▲
New Zealand	521	2.4	▲
Japan	520	3.5	▲
Australia	515	2.3	▲
Netherlands*	508	5.1	▲
Belgium*	506	2.3	▲
Norway	503	2.6	▲
*Estonia**	501	2.6	▲
Switzerland	501	2.4	▲
Poland*	500	2.6	▲
Iceland	500	1.4	▲
United States	500	3.7	▲
Liechtenstein	499	2.8	▲
Sweden*	497	2.9	▲
Germany*	497	2.7	▲
Republic of Ireland*	496	3.0	▲
France*	496	3.4	▲
Chinese Taipei	495	2.6	▲
Denmark*	495	2.1	▲
United Kingdom*	494	2.3	
Hungary*	494	3.2	▲
OECD average	**493**	**0.5**	▲
Portugal*	489	3.1	▲
Macao-China	487	0.9	▲
Italy*	486	1.6	▲
*Latvia**	484	3.0	*NS*
Slovenia*	483	1.0	▲
Greece*	483	4.3	*NS*
Spain*	481	2.0	*NS*
Czech Republic*	478	2.9	*NS*
Slovak Republic*	477	2.5	*NS*
Wales	476	3.4	
Croatia	476	2.9	*NS*
Israel	474	3.6	*NS*
Luxembourg*	472	1.3	*NS*
Austria*	470	2.9	*NS*
*Lithuania**	468	2.4	*NS*
Turkey	464	3.5	▼
Dubai (UAE)	459	1.1	▼
Russian Federation	459	3.3	▼
Chile	449	3.1	▼
Serbia	442	2.4	▼
*Bulgaria**	429	6.7	▼
Mexico	425	2.0	▼
*Romania**	424	4.1	▼

17 countries with scores below 430 omitted

Simple comparison P-value = 5%

key

▲ significantly higher

NS no significant difference

▼ significantly lower

OECD countries (not italicised)

Countries not in OECD (italicised)

*EU countries

A2 Mean score, variation and gender differences in student performance on the reading scale

	All students				Gender differences						Percentiles												Difference between 5th & 95th percentile
	Mean score		Standard deviation		Males		Females		Difference (M - F)		5th		10th		25th		75th		90th		95th		
	Mean	S.E.	S.D.	S.E.	Mean	S.E.	Mean	S.E.	Diff.	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	
Australia	515	(2.3)	99	(1.4)	496	(2.9)	533	(2.6)	**-37**	(3.1)	343	(3.8)	384	(3.1)	450	(2.9)	584	(2.7)	638	(3.2)	668	(3.9)	325
Austria*	470	(2.9)	100	(2.0)	449	(3.8)	490	(4.0)	**-41**	(5.5)	299	(5.2)	334	(6.1)	399	(4.3)	545	(3.3)	596	(3.4)	625	(4.3)	326
Belgium*	506	(2.3)	102	(1.7)	493	(3.4)	520	(2.9)	**-27**	(4.4)	326	(6.1)	368	(4.3)	436	(3.8)	583	(2.2)	631	(2.7)	657	(2.9)	330
*Bulgaria**	429	(6.7)	113	(2.5)	400	(7.3)	461	(5.8)	**-61**	(4.7)	234	(8.4)	276	(7.8)	351	(8.5)	512	(6.5)	572	(7.3)	603	(6.7)	368
Canada	524	(1.5)	90	(0.9)	507	(1.8)	542	(1.7)	**-34**	(1.9)	368	(2.9)	406	(2.7)	464	(1.9)	588	(1.7)	637	(1.9)	664	(2.1)	296
Chile	449	(3.1)	83	(1.7)	439	(3.9)	461	(3.6)	**-22**	(4.1)	310	(5.1)	342	(5.0)	393	(4.1)	506	(3.3)	556	(3.6)	584	(5.1)	274
Chinese Taipei	495	(2.6)	86	(1.9)	477	(3.7)	514	(3.6)	**-37**	(5.3)	343	(4.6)	380	(3.9)	439	(3.2)	555	(2.9)	600	(4.6)	627	(6.3)	284
Croatia	476	(2.9)	88	(1.6)	452	(3.4)	503	(3.7)	**-51**	(4.6)	327	(4.9)	359	(3.6)	416	(4.5)	539	(3.1)	586	(3.5)	611	(3.8)	284
Czech Republic*	478	(2.9)	92	(1.6)	456	(3.7)	504	(3.0)	**-48**	(4.1)	325	(4.8)	357	(4.9)	413	(4.2)	545	(3.3)	598	(3.2)	627	(3.6)	302
Denmark*	495	(2.1)	84	(1.2)	480	(2.5)	509	(2.5)	**-29**	(2.9)	350	(3.8)	383	(3.7)	440	(2.9)	554	(2.8)	599	(3.0)	624	(2.9)	274
Dubai (UAE)	459	(1.1)	107	(0.9)	435	(1.7)	485	(1.5)	**-51**	(2.3)	277	(3.4)	317	(2.8)	386	(2.4)	536	(2.4)	596	(2.7)	628	(3.1)	350
England	495	(2.8)	95	(1.4)	482	(4.3)	507	(3.5)	**-25**	(5.4)	334	(4.9)	370	(3.6)	430	(3.4)	561	(3.9)	616	(3.1)	646	(4.1)	312
*Estonia**	501	(2.6)	83	(1.7)	480	(2.9)	524	(2.8)	**-44**	(2.5)	359	(5.3)	392	(4.4)	446	(3.3)	559	(2.8)	605	(3.6)	633	(4.1)	274
Finland*	536	(2.3)	86	(1.0)	508	(2.6)	563	(2.4)	**-55**	(2.3)	382	(3.4)	419	(3.6)	481	(2.7)	597	(2.2)	642	(2.6)	666	(2.6)	284
France*	496	(3.4)	106	(2.8)	475	(4.3)	515	(3.4)	**-40**	(3.7)	305	(8.2)	352	(7.0)	429	(4.7)	572	(4.0)	624	(3.9)	651	(4.6)	347
Germany*	497	(2.7)	95	(1.8)	478	(3.6)	518	(2.9)	**-40**	(3.9)	333	(4.8)	367	(5.1)	432	(4.5)	567	(2.8)	615	(3.2)	640	(3.1)	307
Greece*	483	(4.3)	95	(2.4)	459	(5.5)	506	(3.5)	**-47**	(4.3)	318	(7.8)	355	(8.0)	420	(6.3)	550	(3.1)	601	(3.7)	630	(3.7)	311
Hong Kong-China	533	(2.1)	84	(1.7)	518	(3.3)	550	(2.8)	**-33**	(4.4)	380	(5.5)	418	(4.5)	482	(3.0)	592	(2.5)	634	(2.9)	659	(3.1)	279
Hungary*	494	(3.2)	90	(2.4)	475	(3.9)	513	(3.6)	**-38**	(4.0)	332	(7.4)	371	(6.9)	435	(4.3)	559	(3.6)	607	(3.5)	632	(4.0)	300
Iceland	500	(1.4)	96	(1.2)	478	(2.1)	522	(1.9)	**-44**	(2.8)	331	(4.9)	371	(4.1)	439	(2.9)	567	(2.0)	619	(2.6)	648	(3.9)	317
Israel	474	(3.6)	112	(2.7)	452	(5.2)	495	(3.4)	**-42**	(5.2)	277	(8.8)	322	(7.8)	401	(4.4)	554	(3.4)	611	(4.0)	643	(4.3)	366
Italy*	486	(1.6)	96	(1.4)	464	(2.3)	510	(1.9)	**-46**	(2.8)	320	(3.7)	358	(2.6)	422	(2.3)	556	(1.7)	604	(1.7)	631	(2.1)	311
Japan	520	(3.5)	100	(2.9)	501	(5.6)	540	(3.7)	**-39**	(6.8)	339	(9.8)	386	(7.1)	459	(4.8)	590	(3.0)	639	(3.6)	667	(4.6)	328
Korea	539	(3.5)	79	(2.1)	523	(4.9)	558	(3.8)	**-35**	(5.9)	400	(7.6)	435	(5.9)	490	(4.1)	595	(3.4)	635	(3.0)	658	(3.8)	258
*Latvia**	484	(3.0)	80	(1.5)	460	(3.4)	507	(3.1)	**-47**	(3.2)	348	(6.3)	379	(4.2)	429	(3.8)	541	(3.3)	584	(3.2)	610	(4.3)	262
Liechtenstein	499	(2.8)	83	(3.5)	484	(4.5)	516	(4.5)	**-32**	(7.1)	355	(12.1)	385	(10.6)	442	(6.5)	560	(4.5)	600	(8.4)	626	(11.8)	270
*Lithuania**	468	(2.4)	86	(1.6)	439	(2.8)	498	(2.6)	**-59**	(2.8)	324	(4.5)	353	(4.1)	409	(3.3)	530	(3.1)	580	(3.4)	608	(4.1)	283
Luxembourg*	472	(1.3)	104	(0.9)	453	(1.9)	492	(1.5)	**-39**	(2.3)	288	(3.6)	332	(3.5)	403	(2.4)	547	(1.7)	600	(2.0)	630	(3.7)	342
Macao-China	487	(0.9)	76	(0.8)	470	(1.3)	504	(1.2)	**-34**	(1.7)	357	(2.7)	388	(1.8)	437	(1.4)	540	(1.4)	582	(1.8)	608	(1.8)	251
Mexico	425	(2.0)	85	(1.2)	413	(2.1)	438	(2.1)	**-25**	(1.6)	281	(3.9)	314	(2.9)	370	(2.4)	485	(1.9)	531	(2.2)	557	(2.4)	276
Netherlands*	508	(5.1)	89	(1.6)	496	(5.1)	521	(5.3)	**-24**	(2.4)	365	(4.7)	390	(5.0)	442	(6.1)	575	(5.4)	625	(4.6)	650	(4.0)	285
New Zealand	521	(2.4)	103	(1.7)	499	(3.6)	544	(2.6)	**-46**	(4.3)	344	(5.8)	383	(4.5)	452	(3.1)	595	(2.8)	649	(2.7)	678	(3.7)	335
Northern Ireland	499	(4.1)	97	(3.5)	485	(7.9)	513	(3.8)	**-29**	(9.4)	336	(13.2)	373	(9.0)	432	(5.5)	569	(3.8)	622	(3.8)	651	(5.4)	315
Norway	503	(2.6)	91	(1.2)	480	(3.0)	527	(2.9)	**-47**	(2.9)	346	(4.5)	382	(4.0)	443	(3.6)	568	(2.9)	619	(3.9)	647	(4.4)	301
Poland*	500	(2.6)	89	(1.3)	476	(2.8)	525	(2.9)	**-50**	(2.5)	346	(5.6)	382	(4.2)	441	(3.4)	565	(3.2)	613	(3.3)	640	(3.6)	293
Portugal*	489	(3.1)	87	(1.6)	470	(3.5)	508	(2.9)	**-38**	(2.4)	338	(4.8)	373	(4.9)	432	(4.4)	551	(3.4)	599	(3.5)	624	(3.6)	286
Republic of Ireland*	496	(3.0)	95	(2.2)	476	(4.2)	515	(3.1)	**-39**	(4.7)	330	(7.8)	373	(4.7)	435	(3.9)	562	(2.8)	611	(2.8)	638	(3.2)	309
*Romania**	424	(4.1)	90	(2.3)	403	(4.6)	445	(4.3)	**-43**	(4.4)	271	(6.9)	304	(5.7)	365	(6.0)	488	(4.7)	537	(4.0)	564	(4.6)	293
Russian Federation	459	(3.3)	90	(2.0)	437	(3.6)	482	(3.4)	**-45**	(2.7)	310	(5.8)	344	(5.5)	401	(3.6)	519	(3.2)	572	(4.5)	607	(5.6)	298
Scotland	500	(3.2)	94	(1.5)	488	(4.5)	512	(3.0)	**-24**	(4.1)	341	(6.2)	379	(4.9)	439	(3.6)	567	(3.5)	621	(4.9)	650	(5.2)	309
Serbia	442	(2.4)	84	(1.5)	422	(3.3)	462	(2.5)	**-39**	(3.0)	299	(4.9)	331	(3.8)	388	(3.2)	501	(2.5)	547	(2.7)	572	(3.3)	274
Shanghai-China	556	(2.4)	80	(1.7)	536	(3.0)	576	(2.3)	**-40**	(2.9)	417	(5.2)	450	(4.8)	504	(3.5)	613	(2.8)	654	(2.7)	679	(3.3)	262
Singapore	526	(1.1)	97	(1.0)	511	(1.7)	542	(1.5)	**-31**	(2.3)	357	(3.4)	394	(3.1)	460	(2.0)	597	(2.1)	648	(2.8)	676	(2.7)	320
Slovak Republic*	477	(2.5)	90	(1.9)	452	(3.5)	503	(2.8)	**-51**	(3.5)	324	(6.1)	358	(5.2)	416	(4.1)	543	(2.7)	594	(3.2)	621	(4.3)	297
Slovenia*	483	(1.0)	91	(0.9)	456	(1.6)	511	(1.4)	**-55**	(2.3)	326	(2.9)	359	(2.1)	421	(1.9)	550	(1.7)	598	(2.9)	623	(3.9)	297
Spain*	481	(2.0)	88	(1.1)	467	(2.2)	496	(2.2)	**-29**	(2.0)	326	(4.2)	364	(3.5)	426	(3.3)	543	(2.0)	588	(2.0)	613	(2.4)	287
Sweden*	497	(2.9)	99	(1.5)	475	(3.2)	521	(3.1)	**-46**	(2.7)	326	(5.3)	368	(5.5)	437	(3.3)	565	(3.2)	620	(3.7)	651	(3.9)	325
Switzerland	501	(2.4)	93	(1.4)	481	(2.9)	520	(2.7)	**-39**	(2.5)	337	(4.1)	374	(4.0)	437	(3.6)	569	(3.0)	617	(3.3)	645	(4.4)	308
Turkey	464	(3.5)	82	(1.7)	443	(3.7)	486	(4.1)	**-43**	(3.7)	325	(5.1)	356	(4.3)	409	(3.8)	522	(4.5)	569	(5.2)	596	(5.4)	270
United Kingdom*	494	(2.3)	95	(1.2)	481	(3.5)	507	(2.9)	**-25**	(4.5)	334	(4.1)	370	(3.1)	430	(2.8)	561	(3.2)	616	(2.6)	646	(3.7)	312
United States	500	(3.7)	97	(1.6)	488	(4.2)	513	(3.8)	**-25**	(3.4)	339	(4.2)	372	(3.9)	433	(4.0)	569	(4.6)	625	(5.0)	656	(5.8)	317
Wales	476	(3.4)	93	(1.6)	462	(3.9)	490	(3.6)	**-27**	(3.2)	319	(6.2)	356	(5.2)	414	(4.4)	541	(3.6)	595	(4.2)	626	(5.0)	307
OECD average	493	(0.5)	93	(0.3)	474	(0.6)	513	(0.5)	**-39**	(0.6)	332	(1.0)	369	(0.8)	432	(0.7)	560	(0.5)	610	(0.6)	637	(0.7)	305

17 countries with scores below 430 omitted

Note: Values that are statistically significant are indicated in bold. OECD countries (not italicised). *Countries not in OECD (italicised).* *EU countries.

A3 Mean performance on each reading subscale

	Mean scores					
	Overall reading scale	Access and retrieve	Integrate and interpret	Reflect and evaluate	Continuous texts	Non-continuous texts
Australia	515	513	513	523	513	524
Austria*	470	477	471	463	470	472
Belgium*	506	513	504	505	504	511
*Bulgaria**	429	430	436	417	433	421
Canada	524	517	522	535	524	527
Chile	449	444	452	452	453	444
Chinese Taipei	495	496	499	493	496	500
Croatia	476	492	472	471	478	472
Czech Republic*	478	479	488	462	479	474
Denmark*	495	502	492	493	496	493
Dubai (UAE)	459	458	457	466	461	460
England	495	491	491	504	492	506
*Estonia**	501	503	500	503	497	512
Finland*	536	532	538	536	535	535
France*	496	492	497	495	492	498
Germany*	497	501	501	491	496	497
Greece*	483	468	484	489	487	472
Hong Kong-China	533	530	530	540	538	522
Hungary*	494	501	496	489	497	487
Iceland	500	507	503	496	501	499
Israel	474	463	473	483	477	467
Italy*	486	482	490	482	489	476
Japan	520	530	520	521	520	518
Korea	539	542	541	542	538	542
*Latvia**	484	476	484	492	484	487
Liechtenstein	499	508	498	498	495	506
*Lithuania**	468	476	469	463	470	462
Luxembourg*	472	471	475	471	471	472
Macao-China	487	493	488	481	488	481
Mexico	425	433	418	432	426	424
Netherlands*	508	519	504	510	506	514
New Zealand	521	521	517	531	518	532
Northern Ireland	499	499	497	504	499	506
Norway	503	512	502	505	505	498
Poland*	500	500	503	498	502	496
Portugal*	489	488	487	496	492	488
Republic of Ireland*	496	498	494	502	497	496
*Romania**	424	423	425	426	423	424
Russian Federation	459	469	467	441	461	452
Scotland	500	504	500	501	497	511
Serbia	442	449	445	430	444	438
Shanghai-China	556	549	558	557	564	539
Singapore	526	526	525	529	522	539
Slovak Republic*	477	491	481	466	479	471
Slovenia*	483	489	489	470	484	476
Spain*	481	480	481	483	484	473
Sweden*	497	505	494	502	499	498
Switzerland	501	505	502	497	498	505
Turkey	464	467	459	473	466	461
United Kingdom*	494	491	491	503	492	506
United States	500	492	495	512	500	503
Wales	476	477	472	483	474	486
OECD average	493	495	493	494	494	493

	Difference from overall mean				
	Access and retrieve	Integrate and interpret	Reflect and evaluate	Continuous texts	Non-continuous texts
Australia	-2	-2	8	-2	9
Austria*	7	1	-7	0	2
Belgium*	7	-2	-1	-2	5
*Bulgaria**	0	7	-12	4	-8
Canada	-8	-2	11	0	3
Chile	-5	3	3	4	-6
Chinese Taipei	1	4	-2	1	5
Croatia	16	-3	-5	2	-4
Czech Republic*	1	9	-16	1	-4
Denmark*	7	-3	-2	1	-2
Dubai (UAE)	-1	-3	6	1	0
England	-4	-4	10	-3	12
*Estonia**	2	-1	2	-4	11
Finland*	-4	2	0	-1	-1
France*	-4	2	0	-4	3
Germany*	3	3	-6	-2	0
Greece*	-15	2	7	4	-11
Hong Kong-China	-4	-3	6	5	-11
Hungary*	7	2	-5	3	-7
Iceland	6	2	-4	0	-1
Israel	-11	-1	9	3	-7
Italy*	-4	4	-4	3	-10
Japan	10	0	1	1	-2
Korea	2	1	3	-1	3
*Latvia**	-8	0	8	0	3
Liechtenstein	8	-2	-2	-5	7
*Lithuania**	8	0	-5	2	-6
Luxembourg*	-2	3	-2	-1	-1
Macao-China	6	2	-6	1	-6
Mexico	7	-7	7	1	-1
Netherlands*	11	-4	2	-2	6
New Zealand	0	-4	10	-3	11
Northern Ireland	-1	-2	5	-1	6
Norway	9	-1	2	2	-6
Poland*	0	2	-3	2	-5
Portugal*	-1	-3	7	3	-1
Republic of Ireland*	2	-2	7	1	1
*Romania**	-2	0	2	-1	0
Russian Federation	9	7	-19	1	-7
Scotland	4	0	1	-3	11
Serbia	7	3	-12	2	-4
Shanghai-China	-7	2	1	8	-16
Singapore	0	-1	3	-4	13
Slovak Republic*	13	4	-12	2	-6
Slovenia*	6	6	-13	1	-7
Spain*	-1	0	2	3	-9
Sweden*	7	-3	5	2	0
Switzerland	5	1	-3	-2	5
Turkey	3	-5	8	2	-3
United Kingdom*	-3	-4	9	-3	11
United States	-8	-5	12	0	3
Wales	1	-4	7	-2	10
OECD average	1	0	1	0	0

17 countries with scores below 430 omitted

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

Differences are based on unrounded figures and are rounded to the nearest whole number.

A4 Mean score, variation and gender differences in student performance on the access and retrieve scale

	All students				Gender differences						Percentiles												Difference between 5th & 95th percentile
	Mean score		Standard deviation		Males		Females		Difference (M - F)		5th		10th		25th		75th		90th		95th		
	Mean	S.E.	S.D.	S.E.	Mean	S.E.	Mean	S.E.	Diff.	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	
Australia	513	(2.4)	100	(1.3)	495	(2.9)	531	(2.7)	**-36**	(2.8)	337	(4.5)	381	(3.5)	451	(2.7)	583	(2.6)	635	(3.4)	665	(3.6)	328
Austria*	477	(3.2)	109	(2.2)	459	(4.1)	494	(4.3)	**-35**	(5.8)	291	(5.9)	329	(4.9)	402	(5.1)	557	(3.8)	616	(4.7)	646	(4.7)	355
Belgium*	513	(2.4)	108	(1.8)	498	(3.5)	530	(3.0)	**-32**	(4.6)	323	(6.2)	368	(4.6)	444	(3.5)	591	(2.8)	643	(3.0)	673	(3.4)	350
*Bulgaria**	430	(8.3)	139	(3.3)	399	(9.3)	463	(7.0)	**-64**	(5.6)	183	(10.1)	239	(12.7)	339	(10.3)	530	(8.1)	599	(8.8)	637	(9.8)	454
Canada	517	(1.5)	95	(1.0)	498	(1.9)	536	(1.6)	**-38**	(2.0)	353	(3.2)	393	(2.7)	456	(2.0)	583	(2.0)	634	(2.3)	664	(2.7)	310
Chile	444	(3.4)	91	(2.0)	434	(4.4)	454	(3.4)	**-20**	(4.1)	290	(6.5)	328	(5.7)	384	(4.3)	506	(3.7)	559	(4.3)	591	(4.5)	300
Chinese Taipei	496	(2.8)	105	(1.8)	477	(4.0)	516	(3.8)	**-39**	(5.7)	312	(6.0)	358	(4.1)	429	(3.9)	570	(3.6)	625	(3.8)	656	(4.4)	344
Croatia	492	(3.1)	101	(1.9)	467	(3.7)	519	(3.9)	**-52**	(4.8)	318	(5.8)	359	(5.3)	427	(4.5)	563	(3.4)	616	(3.3)	646	(4.8)	329
Czech Republic*	479	(3.2)	99	(1.7)	455	(4.4)	506	(3.5)	**-52**	(4.8)	309	(6.2)	349	(5.6)	412	(4.3)	551	(3.5)	605	(3.7)	635	(3.6)	326
Denmark*	502	(2.6)	94	(1.4)	486	(3.1)	518	(2.9)	**-31**	(3.1)	339	(5.6)	376	(4.4)	440	(3.5)	569	(3.1)	619	(3.1)	648	(4.8)	309
Dubai (UAE)	458	(1.4)	117	(1.3)	436	(1.9)	482	(1.8)	**-46**	(2.5)	258	(5.3)	304	(2.7)	380	(2.5)	543	(2.2)	606	(2.9)	639	(3.6)	381
England	491	(3.1)	101	(1.9)	475	(4.7)	506	(3.5)	**-30**	(5.7)	321	(5.6)	360	(5.2)	426	(3.8)	561	(3.3)	616	(4.4)	649	(5.0)	328
*Estonia**	503	(3.0)	91	(1.7)	484	(3.4)	523	(3.2)	**-40**	(3.3)	345	(4.8)	381	(4.0)	444	(3.6)	567	(3.6)	617	(4.0)	647	(4.1)	302
Finland	532	(2.7)	99	(1.2)	503	(3.1)	562	(2.8)	**-59**	(2.5)	357	(5.6)	401	(4.0)	470	(3.6)	602	(2.9)	653	(3.1)	682	(3.7)	326
France*	492	(3.8)	110	(3.2)	471	(4.7)	511	(3.6)	**-40**	(3.8)	298	(9.5)	347	(7.6)	422	(4.7)	571	(4.5)	625	(4.6)	656	(5.0)	359
Germany*	501	(3.5)	104	(2.2)	482	(4.5)	520	(3.8)	**-38**	(4.4)	318	(7.2)	358	(6.0)	429	(5.3)	578	(4.0)	630	(4.1)	658	(4.5)	340
Greece*	468	(4.4)	103	(2.5)	445	(5.5)	490	(4.1)	**-45**	(4.9)	285	(9.5)	330	(8.5)	401	(6.3)	540	(4.0)	595	(3.8)	627	(3.6)	342
Hong Kong-China	530	(2.7)	94	(1.9)	516	(4.1)	545	(3.2)	**-28**	(4.8)	361	(5.9)	404	(4.8)	471	(3.4)	596	(2.7)	642	(3.5)	669	(5.2)	308
Hungary*	501	(3.7)	104	(3.1)	484	(4.4)	519	(4.4)	**-34**	(4.6)	315	(11.0)	362	(8.6)	437	(5.0)	576	(4.0)	627	(4.0)	654	(4.4)	339
Iceland	507	(1.6)	108	(1.4)	481	(2.4)	532	(2.3)	**-51**	(3.4)	319	(5.5)	363	(3.8)	439	(3.4)	580	(2.7)	639	(3.0)	672	(4.1)	353
Israel	463	(4.1)	120	(3.1)	439	(6.2)	486	(3.7)	**-47**	(6.2)	247	(12.1)	299	(8.7)	386	(5.5)	548	(3.7)	610	(4.1)	643	(4.8)	397
Italy*	482	(1.8)	105	(1.5)	460	(2.6)	504	(2.2)	**-44**	(3.1)	295	(4.7)	341	(3.2)	415	(2.6)	557	(1.7)	609	(1.7)	639	(2.1)	344
Japan	530	(3.8)	110	(3.2)	512	(6.1)	548	(4.0)	**-36**	(7.2)	333	(10.4)	386	(7.9)	464	(4.8)	605	(3.3)	658	(4.7)	691	(4.9)	357
Korea	542	(3.6)	87	(2.3)	527	(5.0)	558	(3.9)	**-32**	(5.9)	391	(7.8)	429	(6.3)	486	(4.2)	602	(3.6)	650	(3.7)	677	(4.8)	287
*Latvia**	476	(3.6)	92	(1.9)	452	(4.2)	501	(3.6)	**-49**	(3.7)	319	(6.7)	356	(5.4)	416	(4.7)	542	(3.8)	590	(4.0)	617	(4.2)	298
Liechtenstein	508	(4.0)	93	(3.8)	492	(6.2)	525	(6.5)	**-33**	(9.9)	344	(21.4)	385	(10.2)	448	(9.8)	574	(6.5)	621	(7.7)	650	(11.9)	307
*Lithuania**	476	(3.0)	102	(1.9)	446	(3.8)	508	(2.7)	**-61**	(3.2)	303	(5.8)	343	(5.5)	408	(4.1)	548	(3.1)	605	(3.7)	637	(3.7)	333
Luxembourg*	471	(1.3)	115	(1.1)	449	(2.0)	493	(1.6)	**-44**	(2.5)	266	(5.7)	318	(3.2)	396	(2.9)	553	(2.3)	612	(2.3)	645	(3.9)	379
Macao-China	493	(1.2)	88	(0.9)	477	(1.6)	509	(1.3)	**-31**	(1.8)	342	(3.3)	379	(2.0)	435	(2.3)	554	(1.5)	603	(2.3)	630	(2.3)	289
Mexico	433	(2.1)	94	(1.4)	422	(2.4)	443	(2.2)	**-21**	(1.8)	271	(4.4)	311	(3.4)	373	(2.6)	498	(2.0)	548	(2.3)	577	(2.7)	306
Netherlands*	519	(5.1)	92	(1.6)	506	(5.0)	532	(5.4)	**-26**	(2.5)	364	(6.7)	396	(5.2)	453	(5.8)	588	(5.5)	634	(5.0)	661	(6.3)	297
New Zealand	521	(2.4)	106	(1.7)	497	(3.5)	546	(2.7)	**-49**	(4.2)	338	(4.9)	381	(4.4)	452	(3.4)	597	(2.8)	650	(3.0)	680	(3.3)	342
Northern Ireland	499	(4.7)	98	(4.0)	481	(8.3)	516	(4.0)	**-35**	(9.3)	330	(13.9)	371	(10.5)	435	(6.6)	567	(3.8)	621	(4.6)	652	(4.7)	322
Norway	512	(2.8)	99	(1.6)	488	(3.5)	537	(3.0)	**-49**	(3.4)	340	(5.2)	382	(4.5)	449	(3.5)	580	(3.4)	634	(3.6)	665	(4.1)	325
Poland*	500	(2.8)	101	(1.4)	475	(3.1)	525	(3.1)	**-50**	(2.9)	326	(5.0)	369	(4.0)	435	(3.6)	569	(2.9)	626	(3.9)	660	(4.2)	333
Portugal*	488	(3.3)	93	(2.0)	469	(3.9)	506	(3.2)	**-37**	(3.0)	326	(6.2)	367	(5.5)	430	(4.3)	553	(3.6)	602	(4.5)	631	(4.6)	305
Republic of Ireland*	498	(3.3)	99	(2.4)	476	(4.5)	521	(3.4)	**-44**	(4.6)	321	(9.7)	372	(5.4)	439	(4.1)	567	(2.8)	616	(4.0)	643	(4.1)	322
*Romania**	423	(4.7)	102	(2.7)	402	(5.6)	442	(4.6)	**-40**	(5.1)	243	(8.6)	287	(6.9)	357	(6.1)	494	(4.8)	548	(4.7)	576	(5.7)	333
Russian Federation	469	(3.9)	103	(2.0)	446	(4.2)	491	(4.1)	**-45**	(2.9)	297	(7.7)	339	(6.1)	403	(4.7)	536	(4.4)	599	(4.6)	636	(6.1)	339
Scotland	504	(3.8)	105	(2.1)	486	(5.0)	522	(3.8)	**-36**	(4.5)	327	(8.0)	368	(5.2)	435	(5.1)	576	(4.7)	636	(5.1)	669	(5.8)	342
Serbia	449	(3.1)	95	(2.0)	430	(4.2)	469	(3.1)	**-39**	(4.1)	284	(6.4)	324	(5.6)	389	(3.8)	515	(3.2)	567	(3.9)	595	(3.9)	311
Shanghai-China	549	(2.9)	96	(1.9)	531	(3.7)	568	(2.6)	**-37**	(3.3)	382	(5.9)	423	(5.3)	489	(3.8)	617	(3.0)	666	(3.4)	695	(4.1)	312
Singapore	526	(1.4)	103	(1.2)	510	(2.0)	543	(1.9)	**-32**	(2.8)	345	(5.3)	388	(3.4)	459	(2.5)	599	(1.6)	651	(3.5)	680	(3.6)	335
Slovak Republic*	491	(3.0)	103	(2.6)	463	(4.3)	518	(3.3)	**-55**	(4.3)	311	(8.5)	353	(7.0)	423	(4.0)	563	(3.4)	619	(3.7)	648	(4.6)	337
Slovenia*	489	(1.1)	98	(0.8)	461	(1.7)	518	(1.5)	**-57**	(2.5)	314	(4.0)	355	(2.7)	426	(2.2)	561	(1.8)	610	(3.2)	635	(3.3)	322
Spain*	480	(2.1)	100	(1.2)	465	(2.2)	495	(2.5)	**-30**	(2.2)	303	(4.3)	350	(3.4)	419	(2.8)	549	(2.3)	602	(2.5)	632	(2.7)	329
Sweden*	505	(2.9)	104	(1.5)	479	(3.3)	531	(3.2)	**-52**	(2.9)	321	(5.9)	368	(4.7)	440	(3.5)	577	(3.1)	631	(4.7)	664	(3.9)	343
Switzerland	505	(2.7)	97	(1.5)	487	(3.3)	524	(2.8)	**-37**	(2.9)	331	(5.3)	375	(4.6)	443	(4.2)	576	(2.9)	625	(3.8)	653	(4.1)	321
Turkey	467	(4.1)	95	(2.2)	451	(4.5)	484	(4.6)	**-33**	(4.2)	303	(7.9)	343	(5.6)	407	(4.2)	534	(4.8)	586	(4.8)	614	(6.0)	311
United Kingdom*	491	(2.5)	101	(1.6)	476	(3.9)	507	(2.9)	**-31**	(4.6)	321	(4.6)	361	(4.4)	426	(3.3)	561	(2.8)	617	(3.5)	650	(4.2)	330
United States	492	(3.6)	99	(1.5)	480	(4.0)	504	(3.8)	**-24**	(3.4)	325	(5.0)	363	(4.6)	425	(4.0)	561	(4.4)	618	(4.4)	650	(5.4)	325
Wales	477	(3.6)	98	(1.8)	460	(4.3)	494	(3.7)	**-33**	(3.4)	309	(8.1)	351	(5.6)	414	(4.0)	544	(3.9)	598	(4.9)	632	(5.2)	322
OECD average	495	(0.5)	101	(0.3)	475	(0.7)	515	(0.6)	**-40**	(0.7)	318	(1.2)	361	(0.9)	430	(0.7)	566	(0.6)	619	(0.6)	649	(0.7)	331

17 countries with scores below 430 omitted

Note: Values that are statistically significant are indicated in bold

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

A5 Mean score, variation and gender differences in student performance on the integrate and interpret scale

	All students				Gender differences						Percentiles												Difference between 5th & 95th percentile
	Mean score		Standard deviation		Males		Females		Difference (M - F)		5th		10th		25th		75th		90th		95th		
	Mean	S.E.	S.D.	S.E.	Mean	S.E.	Mean	S.E.	Diff.	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	
Australia	513	(2.4)	102	(1.6)	495	(2.9)	529	(2.8)	**-34**	(3.2)	337	(3.6)	377	(3.1)	444	(2.9)	584	(2.5)	641	(3.6)	673	(4.5)	336
Austria*	471	(2.9)	99	(2.0)	451	(3.6)	490	(4.0)	**-39**	(5.5)	305	(5.8)	339	(4.4)	402	(4.3)	544	(3.9)	598	(4.1)	626	(4.0)	321
Belgium*	504	(2.5)	106	(1.8)	492	(3.4)	516	(3.2)	**-24**	(4.4)	320	(5.5)	360	(4.6)	430	(3.5)	584	(2.3)	635	(2.8)	662	(3.4)	342
*Bulgaria**	436	(6.4)	107	(2.4)	409	(7.0)	465	(5.7)	**-55**	(4.5)	256	(7.9)	293	(7.8)	360	(8.6)	514	(6.9)	572	(6.5)	604	(6.5)	347
Canada	522	(1.5)	94	(0.9)	507	(1.9)	537	(1.8)	**-30**	(2.2)	363	(3.2)	398	(2.9)	458	(1.9)	590	(1.8)	642	(2.1)	670	(3.0)	307
Chile	452	(3.1)	85	(1.7)	442	(3.9)	463	(3.4)	**-21**	(4.0)	310	(5.2)	342	(4.7)	395	(4.0)	510	(3.4)	562	(4.3)	593	(4.8)	283
Chinese Taipei	499	(2.5)	87	(1.9)	483	(3.7)	515	(3.7)	**-32**	(5.5)	349	(4.4)	383	(3.8)	441	(3.2)	560	(3.3)	607	(5.0)	635	(5.6)	286
Croatia	472	(2.9)	83	(1.5)	450	(3.4)	497	(3.5)	**-47**	(4.3)	331	(5.2)	362	(4.0)	415	(4.2)	532	(3.3)	577	(3.0)	602	(3.9)	272
Czech Republic*	488	(2.9)	93	(1.5)	465	(3.7)	513	(3.2)	**-48**	(4.4)	334	(4.7)	365	(4.7)	421	(4.0)	555	(3.6)	610	(3.2)	639	(3.3)	305
Denmark*	492	(2.1)	84	(1.2)	480	(2.5)	504	(2.5)	**-24**	(2.8)	348	(4.9)	381	(3.7)	437	(2.7)	552	(2.3)	597	(3.1)	623	(3.6)	275
Dubai (UAE)	457	(1.3)	106	(1.1)	434	(1.9)	480	(1.7)	**-47**	(2.3)	279	(3.2)	318	(2.4)	383	(2.6)	532	(2.1)	594	(2.9)	627	(3.8)	348
England	491	(2.9)	97	(1.4)	479	(4.4)	501	(3.6)	**-22**	(5.6)	330	(4.9)	363	(3.7)	424	(3.6)	558	(3.4)	615	(3.8)	650	(4.0)	320
*Estonia**	500	(2.8)	84	(1.5)	480	(3.3)	522	(2.9)	**-42**	(2.9)	358	(5.3)	389	(4.0)	444	(3.5)	559	(3.0)	605	(3.9)	634	(4.3)	276
Finland*	538	(2.3)	88	(1.0)	513	(2.6)	564	(2.6)	**-50**	(2.3)	385	(3.7)	421	(3.6)	482	(2.7)	601	(2.7)	647	(2.9)	674	(3.2)	289
France*	497	(3.6)	111	(2.8)	477	(4.4)	516	(3.6)	**-39**	(3.9)	300	(8.9)	348	(6.8)	426	(5.2)	577	(4.3)	634	(5.0)	664	(4.7)	364
Germany*	501	(2.8)	96	(1.9)	481	(3.9)	521	(3.0)	**-40**	(4.3)	335	(5.2)	371	(4.4)	433	(4.3)	572	(3.1)	621	(3.0)	649	(3.7)	313
Greece*	484	(4.0)	93	(2.0)	464	(4.9)	504	(3.6)	**-40**	(4.0)	328	(6.5)	362	(7.6)	421	(5.4)	551	(3.6)	602	(3.5)	631	(3.6)	304
Hong Kong-China	530	(2.2)	89	(1.5)	516	(3.6)	546	(3.0)	**-30**	(4.8)	372	(5.1)	412	(4.6)	474	(2.9)	592	(2.9)	639	(3.3)	666	(3.8)	294
Hungary*	496	(3.2)	89	(2.1)	478	(4.0)	514	(3.6)	**-36**	(4.1)	343	(6.7)	376	(5.6)	435	(4.7)	560	(3.9)	609	(3.7)	634	(4.4)	291
Iceland	503	(1.5)	98	(1.3)	483	(2.2)	522	(2.2)	**-39**	(3.2)	332	(4.9)	372	(3.1)	438	(3.3)	571	(2.3)	625	(3.0)	654	(2.8)	322
Israel	473	(3.4)	110	(2.4)	454	(5.0)	491	(3.4)	**-37**	(5.3)	281	(7.8)	324	(6.8)	399	(4.9)	552	(3.3)	609	(3.6)	641	(4.1)	360
Italy*	490	(1.6)	94	(1.3)	469	(2.3)	512	(1.8)	**-43**	(2.7)	328	(3.6)	365	(2.6)	427	(2.1)	558	(1.8)	607	(1.9)	635	(2.1)	307
Japan	520	(3.5)	102	(2.6)	502	(5.6)	538	(3.8)	**-36**	(6.8)	340	(9.0)	384	(7.0)	455	(4.8)	591	(3.2)	642	(4.3)	672	(5.1)	332
Korea	541	(3.4)	81	(2.1)	526	(4.7)	557	(4.1)	**-31**	(6.0)	398	(8.6)	435	(5.8)	489	(4.3)	598	(3.5)	639	(3.5)	664	(3.7)	266
*Latvia**	484	(2.8)	80	(1.5)	462	(3.3)	506	(3.0)	**-44**	(3.0)	352	(5.6)	381	(4.1)	430	(3.6)	541	(3.3)	585	(3.5)	611	(3.4)	258
Liechtenstein	498	(4.0)	90	(3.5)	482	(5.3)	515	(6.5)	**-33**	(8.7)	336	(12.2)	373	(10.6)	436	(7.5)	563	(5.9)	610	(7.7)	632	(18.1)	297
*Lithuania**	469	(2.4)	85	(1.5)	440	(2.8)	498	(2.5)	**-58**	(2.6)	331	(4.5)	358	(3.7)	410	(3.4)	528	(2.8)	578	(3.3)	607	(3.4)	276
Luxembourg*	475	(1.1)	104	(1.1)	457	(1.8)	494	(1.4)	**-37**	(2.4)	294	(4.1)	336	(2.8)	404	(2.2)	551	(1.9)	606	(2.2)	637	(3.3)	343
Macao-China	488	(0.8)	77	(0.7)	473	(1.2)	504	(1.0)	**-31**	(1.6)	357	(2.7)	388	(2.2)	436	(1.6)	542	(1.4)	588	(2.1)	613	(2.2)	256
Mexico	418	(2.0)	87	(1.1)	406	(2.2)	431	(2.1)	**-25**	(1.6)	272	(3.5)	305	(2.7)	360	(2.3)	479	(2.1)	529	(2.5)	558	(3.0)	286
Netherlands*	504	(5.4)	94	(1.8)	494	(5.4)	515	(5.5)	**-22**	(2.5)	353	(5.6)	381	(5.0)	432	(6.2)	575	(6.2)	630	(5.0)	658	(4.9)	305
New Zealand	517	(2.4)	105	(1.7)	497	(3.8)	539	(3.0)	**-42**	(4.8)	338	(5.8)	379	(4.7)	445	(3.3)	593	(3.3)	652	(3.6)	681	(5.4)	343
Northern Ireland	497	(4.2)	99	(3.3)	486	(7.8)	508	(4.4)	**-23**	(9.6)	331	(11.5)	369	(9.1)	429	(5.7)	568	(4.7)	625	(5.0)	657	(5.9)	325
Norway	502	(2.7)	94	(1.3)	481	(3.0)	524	(3.2)	**-42**	(3.1)	341	(4.3)	377	(4.3)	440	(3.1)	567	(3.4)	622	(3.6)	652	(4.4)	311
Poland*	503	(2.8)	91	(1.2)	479	(3.0)	526	(3.0)	**-47**	(2.7)	349	(4.6)	383	(4.1)	442	(3.3)	567	(3.5)	617	(3.3)	648	(3.6)	299
Portugal*	487	(3.0)	87	(1.5)	469	(3.5)	503	(2.9)	**-34**	(2.3)	340	(4.3)	371	(4.1)	427	(4.1)	548	(3.2)	599	(3.7)	627	(3.5)	287
Republic of Ireland*	494	(3.0)	97	(2.1)	476	(4.4)	512	(3.1)	**-37**	(4.8)	328	(7.9)	367	(5.3)	432	(4.3)	562	(2.9)	613	(3.3)	641	(3.9)	313
*Romania**	425	(4.0)	87	(2.2)	405	(4.3)	444	(4.4)	**-39**	(4.3)	279	(5.8)	310	(6.0)	366	(5.3)	486	(4.9)	535	(4.6)	563	(5.3)	284
Russian Federation	467	(3.1)	90	(1.7)	445	(3.5)	489	(3.3)	**-44**	(2.9)	319	(5.1)	352	(4.4)	408	(3.7)	527	(3.8)	582	(5.0)	616	(5.7)	296
Scotland	500	(3.0)	95	(1.6)	490	(4.1)	510	(3.4)	**-20**	(4.5)	342	(5.5)	378	(3.8)	435	(3.8)	567	(3.5)	623	(5.0)	656	(6.3)	314
Serbia	445	(2.4)	84	(1.5)	426	(3.2)	463	(2.6)	**-37**	(3.1)	304	(4.7)	334	(4.0)	389	(3.1)	504	(2.9)	551	(3.2)	577	(3.1)	273
Shanghai-China	558	(2.5)	81	(1.6)	540	(3.2)	576	(2.3)	**-35**	(3.0)	417	(5.7)	449	(4.3)	504	(3.4)	617	(2.8)	659	(3.0)	684	(3.5)	267
Singapore	525	(1.2)	101	(1.1)	511	(1.9)	539	(1.7)	**-28**	(2.7)	351	(3.6)	389	(3.3)	455	(1.9)	598	(1.8)	652	(2.2)	683	(2.8)	333
Slovak Republic*	481	(2.5)	89	(1.9)	456	(3.4)	505	(2.9)	**-49**	(3.5)	332	(5.4)	366	(4.6)	419	(3.4)	545	(3.0)	596	(3.6)	625	(4.3)	293
Slovenia*	489	(1.1)	90	(0.9)	464	(1.5)	514	(1.5)	**-50**	(2.3)	335	(3.4)	366	(2.0)	425	(2.3)	555	(2.3)	605	(2.4)	631	(4.8)	296
Spain*	481	(2.0)	87	(1.0)	468	(2.1)	494	(2.2)	**-27**	(2.1)	329	(4.2)	366	(3.6)	425	(2.8)	541	(1.9)	588	(1.9)	614	(2.3)	285
Sweden*	494	(3.0)	102	(1.6)	475	(3.4)	514	(3.4)	**-40**	(3.2)	319	(6.0)	362	(4.7)	429	(3.5)	564	(3.5)	624	(3.9)	655	(4.2)	336
Switzerland	502	(2.5)	97	(1.5)	484	(2.9)	521	(2.7)	**-37**	(2.6)	334	(4.5)	372	(3.9)	436	(2.8)	572	(2.9)	623	(3.7)	652	(3.9)	318
Turkey	459	(3.3)	78	(1.7)	440	(3.5)	480	(3.9)	**-41**	(3.6)	330	(4.5)	358	(3.3)	405	(3.3)	515	(4.3)	562	(5.1)	588	(5.7)	258
United Kingdom*	491	(2.4)	97	(1.2)	479	(3.6)	501	(3.0)	**-22**	(4.6)	330	(4.0)	364	(3.2)	424	(3.0)	558	(2.8)	615	(3.2)	650	(3.4)	320
United States	495	(3.7)	100	(1.7)	484	(4.4)	506	(3.8)	**-22**	(3.7)	331	(3.9)	364	(3.8)	425	(4.1)	565	(4.6)	626	(5.3)	660	(6.0)	329
Wales	472	(3.6)	96	(1.7)	460	(4.1)	484	(3.7)	**-24**	(3.1)	313	(6.2)	349	(5.1)	406	(4.3)	539	(4.1)	594	(5.0)	629	(5.5)	316
OECD average	493	(0.5)	94	(0.3)	476	(0.6)	512	(0.5)	**-36**	(0.6)	332	(0.9)	368	(0.8)	430	(0.6)	561	(0.6)	613	(0.6)	642	(0.7)	309

17 countries with scores below 430 omitted

Note: Values that are statistically significant are indicated in bold

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

A6 Mean score, variation and gender differences in student performance on the reflect and evaluate scale

	All students				Gender differences						Percentiles												Difference between 5th & 95th percentile
	Mean score		Standard deviation		Males		Females		Difference (M - F)		5th		10th		25th		75th		90th		95th		
	Mean	S.E.	S.D.	S.E.	Mean	S.E.	Mean	S.E.	Diff.	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	
Australia	523	(2.5)	103	(1.4)	501	(3.0)	543	(2.7)	**-42**	(3.1)	344	(3.9)	387	(3.2)	455	(2.8)	595	(2.8)	650	(3.7)	681	(4.6)	336
Austria*	463	(3.4)	107	(2.4)	439	(4.2)	486	(4.6)	**-48**	(6.2)	270	(7.6)	313	(6.7)	389	(5.9)	543	(3.3)	595	(3.9)	623	(4.1)	352
Belgium*	505	(2.5)	108	(2.0)	491	(3.7)	520	(3.1)	**-29**	(4.9)	312	(6.6)	357	(4.7)	436	(4.1)	584	(2.6)	634	(2.6)	661	(3.5)	349
*Bulgaria**	417	(7.1)	121	(2.6)	384	(7.8)	453	(5.9)	**-70**	(4.9)	206	(10.8)	252	(9.9)	336	(10.3)	505	(6.7)	568	(5.3)	602	(5.1)	397
Canada	535	(1.6)	91	(1.0)	516	(1.9)	555	(1.9)	**-38**	(2.0)	377	(3.0)	416	(2.8)	476	(2.3)	598	(1.8)	649	(2.2)	677	(2.3)	300
Chile	452	(3.2)	84	(1.8)	441	(3.7)	465	(3.6)	**-24**	(3.8)	310	(5.6)	342	(4.8)	396	(4.4)	512	(3.2)	559	(3.8)	586	(3.9)	276
Chinese Taipei	493	(2.8)	88	(1.8)	472	(3.7)	514	(3.9)	**-41**	(5.2)	338	(5.3)	376	(3.8)	437	(3.5)	554	(3.1)	599	(3.9)	625	(4.7)	287
Croatia	471	(3.5)	100	(2.0)	442	(4.1)	503	(4.4)	**-62**	(5.3)	301	(6.4)	337	(5.7)	402	(4.9)	543	(3.5)	598	(3.5)	628	(4.4)	327
Czech Republic*	462	(3.1)	100	(1.8)	436	(3.9)	491	(3.4)	**-55**	(4.6)	294	(5.6)	331	(5.3)	394	(3.9)	533	(3.7)	591	(4.4)	623	(3.7)	329
Denmark*	493	(2.6)	88	(1.1)	475	(2.9)	511	(2.9)	**-36**	(2.8)	343	(4.8)	377	(3.6)	435	(3.0)	555	(3.2)	603	(3.6)	631	(3.5)	287
Dubai (UAE)	466	(1.1)	108	(0.9)	438	(1.7)	495	(1.5)	**-57**	(2.2)	281	(3.3)	323	(2.4)	392	(2.2)	544	(2.2)	605	(2.9)	636	(2.9)	355
England	504	(3.0)	98	(1.5)	491	(4.6)	517	(3.7)	**-26**	(5.9)	339	(4.6)	376	(4.3)	438	(3.7)	573	(4.3)	629	(4.0)	661	(3.9)	322
*Estonia**	503	(2.6)	86	(1.7)	479	(3.2)	528	(2.7)	**-49**	(3.1)	355	(5.7)	390	(4.7)	447	(3.8)	562	(2.8)	611	(3.5)	637	(4.5)	282
Finland*	536	(2.2)	87	(1.1)	506	(2.6)	565	(2.3)	**-59**	(2.2)	384	(5.0)	419	(3.4)	480	(3.1)	597	(2.8)	642	(2.4)	668	(3.4)	284
France*	495	(3.4)	107	(2.6)	472	(4.3)	517	(3.5)	**-44**	(3.8)	301	(8.2)	349	(6.7)	427	(4.9)	573	(4.0)	627	(4.4)	654	(4.3)	353
Germany*	491	(2.8)	97	(2.1)	470	(3.9)	513	(2.9)	**-42**	(4.1)	316	(7.6)	357	(6.1)	429	(4.6)	562	(2.8)	609	(2.8)	635	(3.4)	319
Greece*	489	(4.9)	104	(3.1)	460	(6.3)	518	(3.8)	**-57**	(5.0)	306	(11.4)	350	(10.2)	423	(7.1)	563	(3.5)	617	(3.6)	649	(3.9)	343
Hong Kong-China	540	(2.5)	87	(1.9)	520	(3.7)	562	(3.2)	**-42**	(4.8)	381	(6.5)	421	(4.9)	487	(3.8)	600	(2.8)	645	(2.9)	669	(3.1)	288
Hungary*	489	(3.3)	93	(2.3)	469	(4.1)	509	(3.7)	**-41**	(4.3)	327	(7.6)	363	(6.6)	425	(4.8)	556	(3.7)	607	(3.7)	634	(3.8)	307
Iceland	496	(1.4)	94	(1.2)	470	(2.0)	522	(2.0)	**-52**	(2.9)	329	(4.5)	370	(3.8)	437	(2.6)	562	(2.3)	611	(2.8)	638	(3.5)	309
Israel	483	(4.0)	115	(2.9)	458	(5.5)	506	(4.0)	**-48**	(5.6)	275	(9.4)	324	(8.5)	410	(5.5)	566	(3.5)	623	(3.9)	655	(4.3)	380
Italy*	482	(1.8)	105	(1.7)	456	(2.5)	509	(2.2)	**-53**	(3.2)	298	(4.8)	342	(3.2)	413	(2.4)	558	(1.9)	610	(2.0)	638	(2.2)	341
Japan	521	(3.9)	111	(3.3)	498	(6.0)	545	(4.0)	**-47**	(6.9)	323	(11.6)	375	(8.1)	453	(5.7)	598	(3.4)	653	(3.3)	686	(3.9)	362
Korea	542	(3.9)	86	(2.5)	521	(5.4)	565	(4.3)	**-44**	(6.4)	392	(8.9)	429	(6.1)	489	(4.9)	602	(4.1)	646	(4.0)	671	(4.3)	280
*Latvia**	492	(3.0)	82	(1.7)	467	(3.4)	516	(3.2)	**-49**	(3.2)	353	(6.7)	386	(4.6)	439	(3.7)	549	(3.7)	594	(3.5)	619	(3.2)	266
Liechtenstein	498	(3.2)	88	(3.3)	481	(4.7)	516	(5.6)	**-35**	(8.1)	336	(12.3)	373	(12.6)	439	(6.8)	562	(8.0)	605	(7.0)	631	(7.9)	295
*Lithuania**	463	(2.5)	90	(1.6)	432	(2.7)	495	(2.8)	**-63**	(2.7)	311	(5.2)	344	(4.1)	402	(3.4)	527	(3.0)	577	(3.9)	607	(4.7)	295
Luxembourg*	471	(1.1)	106	(1.0)	450	(1.8)	492	(1.5)	**-41**	(2.6)	283	(4.3)	329	(3.2)	402	(2.2)	546	(1.9)	602	(2.6)	631	(3.1)	348
Macao-China	481	(0.8)	79	(0.7)	460	(1.2)	502	(1.2)	**-42**	(1.7)	345	(2.6)	377	(2.3)	429	(1.4)	536	(1.5)	580	(1.8)	605	(2.3)	260
Mexico	432	(1.9)	88	(1.2)	419	(2.1)	445	(2.0)	**-27**	(1.7)	282	(4.2)	318	(2.8)	375	(2.4)	494	(1.9)	541	(1.9)	568	(2.0)	286
Netherlands*	510	(5.0)	86	(1.8)	496	(5.0)	524	(5.2)	**-28**	(2.3)	370	(5.0)	397	(5.9)	447	(6.5)	575	(4.9)	624	(3.9)	649	(3.9)	279
New Zealand	531	(2.5)	108	(2.0)	506	(3.8)	556	(2.8)	**-51**	(4.6)	343	(6.9)	385	(5.4)	458	(3.6)	609	(2.6)	666	(3.0)	696	(3.6)	353
Northern Ireland	504	(4.5)	102	(3.8)	487	(8.4)	521	(4.3)	**-34**	(10.1)	332	(12.7)	370	(9.7)	436	(6.5)	576	(3.7)	633	(4.2)	665	(5.5)	333
Norway	505	(2.7)	93	(1.3)	478	(3.1)	533	(2.9)	**-55**	(2.7)	343	(4.3)	381	(3.9)	445	(3.7)	571	(3.1)	621	(3.5)	650	(3.4)	307
Poland*	498	(2.8)	91	(1.3)	469	(3.1)	526	(2.9)	**-56**	(2.6)	340	(4.7)	379	(3.8)	440	(3.1)	562	(3.1)	611	(3.5)	639	(3.5)	299
Portugal*	496	(3.3)	93	(1.5)	473	(3.7)	519	(3.3)	**-45**	(2.7)	335	(4.6)	372	(4.5)	434	(4.5)	562	(3.3)	614	(3.4)	642	(3.7)	306
Republic of Ireland*	502	(3.1)	99	(1.9)	484	(4.2)	522	(3.5)	**-38**	(4.7)	330	(7.9)	371	(5.6)	439	(4.0)	572	(3.0)	624	(3.3)	652	(3.2)	322
*Romania**	426	(4.5)	97	(2.8)	401	(5.1)	451	(4.7)	**-51**	(4.9)	259	(7.9)	298	(6.8)	363	(6.0)	495	(5.2)	547	(5.4)	576	(5.9)	317
Russian Federation	441	(3.7)	98	(2.3)	417	(4.1)	464	(3.9)	**-47**	(3.1)	277	(6.6)	316	(6.3)	377	(4.2)	506	(3.7)	563	(4.6)	597	(4.8)	320
Scotland	501	(3.4)	98	(1.6)	488	(4.9)	515	(3.3)	**-28**	(4.6)	335	(6.2)	374	(5.0)	436	(4.0)	571	(4.6)	627	(5.0)	661	(6.9)	326
Serbia	430	(2.6)	90	(1.6)	408	(3.5)	453	(2.7)	**-45**	(3.3)	277	(5.2)	311	(4.2)	369	(3.0)	494	(2.6)	544	(3.4)	572	(3.3)	295
Shanghai-China	557	(2.4)	85	(1.6)	531	(2.9)	582	(2.4)	**-50**	(2.8)	408	(5.9)	445	(4.3)	502	(3.3)	616	(2.8)	661	(2.9)	686	(3.4)	278
Singapore	529	(1.1)	100	(1.1)	511	(1.8)	548	(1.6)	**-37**	(2.6)	355	(3.7)	394	(2.7)	462	(2.1)	601	(1.6)	654	(2.5)	684	(4.1)	329
Slovak Republic*	466	(2.9)	98	(2.1)	437	(4.1)	494	(3.0)	**-57**	(4.1)	297	(7.3)	335	(6.3)	400	(4.3)	537	(3.0)	590	(3.6)	619	(3.9)	322
Slovenia*	470	(1.2)	100	(1.0)	439	(1.6)	503	(1.6)	**-64**	(2.3)	296	(3.7)	335	(2.9)	401	(2.0)	544	(2.0)	596	(3.5)	624	(4.0)	328
Spain*	483	(2.2)	95	(1.2)	467	(2.6)	501	(2.3)	**-34**	(2.2)	312	(5.0)	356	(3.9)	425	(3.1)	550	(2.2)	598	(2.3)	625	(2.5)	312
Sweden*	502	(3.0)	100	(1.7)	476	(3.2)	529	(3.3)	**-53**	(2.8)	326	(7.0)	372	(5.4)	442	(3.5)	571	(3.5)	626	(4.2)	658	(4.2)	331
Switzerland	497	(2.7)	96	(1.7)	476	(3.3)	519	(2.9)	**-44**	(2.7)	327	(6.1)	368	(5.0)	433	(3.7)	566	(3.3)	616	(3.7)	645	(4.8)	318
Turkey	473	(4.0)	94	(2.0)	447	(4.4)	500	(4.5)	**-54**	(4.5)	315	(6.1)	349	(4.8)	409	(4.7)	539	(4.9)	591	(4.7)	621	(5.7)	306
United Kingdom*	503	(2.4)	98	(1.2)	489	(3.8)	516	(3.1)	**-27**	(4.9)	338	(3.7)	375	(3.3)	437	(3.0)	572	(3.2)	628	(3.3)	661	(3.1)	323
United States	512	(4.0)	98	(1.7)	498	(4.6)	527	(4.1)	**-29**	(3.6)	347	(5.7)	382	(5.1)	444	(4.2)	583	(4.8)	637	(5.5)	668	(5.8)	322
Wales	483	(3.8)	97	(1.8)	468	(4.4)	498	(3.8)	**-31**	(3.4)	319	(7.9)	356	(5.2)	418	(4.9)	550	(4.7)	607	(4.8)	640	(4.9)	321
OECD average	494	(0.5)	97	(0.3)	472	(0.7)	517	(0.6)	**-44**	(0.7)	325	(1.1)	365	(0.9)	431	(0.7)	564	(0.6)	615	(0.6)	644	(0.7)	319

17 countries with scores below 430 omitted

Note: Values that are statistically significant are indicated in bold

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

A7 Mean score, variation and gender differences in student performance on the continuous texts scale

	All students				Gender differences						Percentiles										Difference between 5th & 95th percentile
	Mean score		Standard deviation		Males		Females		Difference		5th		10th		25th		75th		90th		95th		
	Mean	S.E.	S.D.	S.E.	Mean	S.E.	Mean	S.E.	Diff.	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	
Australia	513	(2.5)	102	(1.4)	493	(3.0)	532	(2.8)	**-38**	(3.1)	336	(4.0)	377	(3.4)	446	(2.6)	585	(2.8)	641	(3.8)	671	(4.5)	336
Austria*	470	(2.9)	100	(2.0)	448	(3.8)	492	(4.1)	**-44**	(5.7)	301	(4.7)	336	(5.0)	399	(4.2)	544	(3.1)	596	(3.6)	625	(4.7)	324
Belgium*	504	(2.4)	103	(1.7)	491	(3.4)	518	(3.0)	**-27**	(4.4)	326	(5.6)	365	(4.4)	433	(3.9)	582	(2.3)	631	(2.4)	657	(2.6)	331
*Bulgaria**	433	(6.8)	116	(2.8)	401	(7.4)	466	(5.9)	**-65**	(4.7)	230	(7.9)	276	(9.9)	354	(8.2)	517	(6.7)	578	(6.3)	611	(7.2)	381
Canada	524	(1.5)	94	(0.9)	506	(1.9)	543	(1.7)	**-37**	(2.1)	363	(3.7)	401	(2.7)	462	(2.2)	590	(1.9)	642	(2.2)	671	(2.4)	308
Chile	453	(3.1)	86	(1.7)	440	(3.9)	466	(3.5)	**-26**	(3.9)	308	(5.2)	340	(4.6)	395	(4.1)	512	(3.3)	563	(3.9)	592	(4.8)	283
Chinese Taipei	496	(2.6)	88	(1.9)	477	(3.7)	516	(3.6)	**-39**	(5.3)	341	(4.8)	379	(4.3)	440	(3.2)	558	(3.5)	604	(4.9)	631	(5.2)	290
Croatia	478	(2.9)	90	(1.7)	452	(3.4)	508	(3.7)	**-56**	(4.5)	324	(4.6)	358	(4.1)	417	(3.9)	543	(3.2)	591	(3.6)	618	(4.2)	294
Czech Republic*	479	(2.9)	93	(1.5)	455	(3.7)	507	(3.1)	**-52**	(4.2)	326	(5.3)	358	(4.9)	413	(3.6)	544	(3.2)	601	(3.5)	632	(3.5)	305
Denmark*	496	(2.1)	86	(1.0)	480	(2.5)	512	(2.6)	**-32**	(2.9)	348	(4.3)	381	(3.2)	439	(2.8)	557	(2.5)	605	(2.8)	632	(3.4)	284
Dubai (UAE)	461	(1.2)	108	(1.1)	433	(1.9)	490	(1.7)	**-58**	(2.7)	277	(3.7)	317	(3.9)	388	(2.2)	537	(2.3)	598	(3.4)	632	(3.4)	356
England	492	(2.9)	98	(1.4)	479	(4.6)	504	(3.6)	**-26**	(5.8)	329	(5.2)	365	(3.9)	425	(4.1)	560	(3.8)	617	(3.6)	650	(4.7)	320
*Estonia**	497	(2.7)	81	(1.6)	475	(3.0)	521	(2.6)	**-46**	(2.3)	359	(4.9)	391	(4.9)	443	(3.6)	553	(2.8)	599	(3.6)	626	(3.8)	267
Finland*	535	(2.3)	86	(1.0)	507	(2.6)	563	(2.4)	**-56**	(2.3)	384	(5.2)	419	(3.7)	480	(2.8)	597	(2.3)	641	(2.3)	665	(2.9)	282
France*	492	(3.5)	109	(2.8)	470	(4.3)	512	(3.6)	**-42**	(3.7)	297	(8.6)	344	(7.0)	422	(5.0)	571	(4.3)	625	(4.2)	654	(4.7)	357
Germany*	496	(2.7)	95	(1.8)	476	(3.7)	517	(3.0)	**-41**	(4.0)	329	(5.5)	366	(5.1)	431	(4.2)	566	(2.9)	613	(2.9)	641	(3.1)	312
Greece*	487	(4.3)	99	(2.3)	461	(5.4)	512	(3.6)	**-51**	(4.4)	317	(8.5)	355	(7.6)	420	(6.5)	557	(3.6)	610	(3.5)	639	(3.8)	322
Hong Kong-China	538	(2.3)	88	(1.7)	520	(3.5)	559	(3.0)	**-38**	(4.5)	379	(6.4)	421	(5.0)	483	(3.4)	600	(2.5)	644	(2.7)	671	(2.9)	292
Hungary*	497	(3.3)	93	(2.5)	476	(4.0)	518	(3.7)	**-42**	(4.0)	335	(6.9)	370	(7.2)	436	(4.8)	563	(3.6)	613	(3.6)	639	(3.6)	304
Iceland	501	(1.6)	99	(1.3)	477	(2.4)	524	(2.3)	**-48**	(3.5)	327	(5.0)	367	(3.4)	438	(2.7)	569	(2.2)	623	(3.4)	653	(4.1)	326
Israel	477	(3.6)	111	(2.6)	454	(5.1)	499	(3.5)	**-44**	(5.1)	278	(8.7)	325	(7.6)	405	(4.8)	557	(3.4)	614	(3.6)	646	(4.2)	367
Italy*	489	(1.6)	97	(1.3)	465	(2.3)	514	(1.9)	**-49**	(2.8)	320	(3.7)	358	(3.1)	424	(2.4)	560	(1.8)	609	(1.7)	636	(2.0)	316
Japan	520	(3.6)	104	(2.8)	501	(5.7)	541	(3.8)	**-39**	(6.8)	332	(10.6)	382	(8.2)	457	(5.1)	594	(2.9)	644	(3.5)	672	(3.4)	340
Korea	538	(3.5)	80	(2.3)	520	(4.8)	558	(4.0)	**-38**	(6.0)	395	(7.4)	431	(6.1)	489	(3.9)	595	(3.4)	635	(3.5)	658	(3.9)	263
*Latvia**	484	(3.0)	80	(1.6)	459	(3.5)	508	(3.1)	**-49**	(3.2)	347	(6.6)	378	(4.6)	430	(4.2)	541	(3.8)	584	(3.1)	608	(4.4)	261
Liechtenstein	495	(3.0)	86	(3.3)	479	(4.8)	513	(5.6)	**-34**	(8.5)	344	(12.8)	378	(8.7)	431	(7.8)	558	(6.2)	604	(7.8)	626	(10.6)	282
*Lithuania**	470	(2.5)	86	(1.7)	440	(2.8)	502	(2.6)	**-62**	(2.6)	325	(5.5)	357	(4.3)	410	(3.6)	531	(2.8)	580	(3.1)	607	(4.8)	282
Luxembourg*	471	(1.2)	105	(1.0)	450	(1.9)	493	(1.3)	**-43**	(2.4)	283	(4.4)	327	(3.4)	402	(2.7)	548	(2.2)	602	(2.7)	631	(3.0)	348
Macao-China	488	(0.9)	80	(0.7)	469	(1.2)	507	(1.1)	**-37**	(1.5)	351	(2.4)	382	(2.1)	434	(1.5)	543	(1.4)	590	(1.7)	617	(2.5)	265
Mexico	426	(2.0)	87	(1.3)	411	(2.2)	440	(2.1)	**-28**	(1.8)	276	(4.2)	311	(3.0)	369	(2.7)	487	(1.9)	534	(1.9)	560	(2.3)	284
Netherlands*	506	(5.0)	89	(1.7)	493	(5.0)	519	(5.2)	**-26**	(2.6)	363	(4.6)	390	(5.0)	440	(6.2)	573	(5.4)	623	(4.8)	650	(5.0)	288
New Zealand	518	(2.4)	106	(1.7)	495	(3.6)	542	(3.0)	**-47**	(4.6)	336	(5.9)	377	(4.6)	447	(3.3)	594	(2.6)	650	(3.2)	680	(3.5)	343
Northern Ireland	499	(4.3)	100	(3.6)	483	(8.0)	514	(4.2)	**-31**	(9.6)	329	(12.4)	369	(10.0)	431	(6.0)	570	(3.7)	626	(4.9)	657	(5.2)	328
Norway	505	(2.6)	95	(1.3)	480	(3.0)	532	(2.9)	**-52**	(2.9)	341	(4.7)	378	(4.2)	442	(2.8)	574	(3.2)	625	(3.2)	653	(3.8)	312
Poland*	502	(2.7)	90	(1.4)	476	(2.9)	528	(2.9)	**-53**	(2.5)	349	(4.6)	384	(3.6)	442	(3.5)	566	(3.0)	615	(3.5)	643	(3.5)	294
Portugal*	492	(3.2)	90	(1.5)	471	(3.7)	512	(3.0)	**-41**	(2.5)	336	(4.0)	372	(5.0)	432	(4.4)	555	(3.4)	605	(3.4)	632	(3.6)	295
Republic of Ireland*	497	(3.3)	98	(2.3)	476	(4.5)	517	(3.6)	**-41**	(4.9)	324	(7.8)	368	(6.2)	435	(4.1)	565	(3.5)	616	(4.0)	645	(3.6)	321
*Romania**	423	(4.0)	92	(2.4)	399	(4.4)	447	(4.3)	**-48**	(4.6)	265	(6.3)	300	(5.8)	362	(5.4)	488	(4.3)	536	(4.7)	566	(4.7)	301
Russian Federation	461	(3.1)	88	(1.7)	437	(3.3)	484	(3.2)	**-47**	(2.7)	312	(5.9)	347	(4.4)	403	(3.7)	520	(3.4)	573	(4.1)	605	(4.8)	292
Scotland	497	(3.1)	97	(1.7)	485	(4.4)	510	(3.1)	**-25**	(4.2)	335	(6.2)	374	(4.5)	433	(3.5)	566	(4.5)	623	(4.1)	653	(4.0)	318
Serbia	444	(2.3)	83	(1.7)	423	(3.2)	465	(2.5)	**-43**	(3.3)	302	(4.8)	336	(3.9)	389	(3.4)	502	(2.6)	547	(3.0)	573	(3.6)	271
Shanghai-China	564	(2.5)	82	(1.7)	541	(3.1)	587	(2.4)	**-45**	(3.1)	422	(5.6)	456	(4.7)	511	(3.5)	623	(2.9)	665	(2.8)	689	(3.0)	267
Singapore	522	(1.1)	100	(1.2)	506	(1.7)	538	(1.5)	**-32**	(2.4)	347	(4.0)	386	(3.8)	455	(2.1)	594	(1.7)	648	(2.8)	677	(3.2)	330
Slovak Republic*	479	(2.6)	91	(1.9)	452	(3.7)	506	(2.7)	**-54**	(3.6)	326	(5.5)	359	(5.5)	417	(4.0)	544	(2.9)	595	(3.3)	623	(3.7)	297
Slovenia*	484	(1.1)	95	(0.9)	455	(1.6)	514	(1.5)	**-59**	(2.4)	323	(2.3)	355	(2.5)	418	(2.2)	553	(2.1)	605	(2.8)	631	(2.7)	308
Spain*	484	(2.1)	91	(1.1)	469	(2.3)	500	(2.3)	**-31**	(2.2)	324	(3.6)	363	(3.5)	428	(3.1)	548	(1.8)	595	(1.9)	622	(2.2)	297
Sweden*	499	(3.0)	101	(1.5)	476	(3.2)	523	(3.3)	**-47**	(2.8)	323	(6.0)	368	(5.0)	435	(3.8)	569	(3.4)	626	(3.5)	657	(3.9)	334
Switzerland	498	(2.5)	95	(1.5)	478	(2.9)	519	(2.7)	**-41**	(2.6)	332	(4.6)	370	(4.3)	434	(3.8)	567	(2.9)	616	(3.6)	644	(4.1)	312
Turkey	466	(3.5)	84	(1.6)	443	(3.7)	491	(4.1)	**-48**	(3.6)	326	(5.6)	357	(4.3)	409	(3.7)	525	(4.2)	573	(4.8)	599	(5.4)	274
United Kingdom*	492	(2.4)	98	(1.2)	478	(3.8)	504	(3.0)	**-26**	(4.8)	329	(4.1)	365	(3.2)	425	(3.4)	560	(3.1)	617	(3.0)	649	(4.1)	320
United States	500	(3.7)	100	(1.6)	487	(4.4)	513	(3.8)	**-26**	(3.6)	334	(4.1)	368	(4.8)	430	(4.0)	571	(4.6)	632	(5.8)	664	(5.2)	330
Wales	474	(3.4)	95	(1.5)	460	(4.0)	488	(3.6)	**-28**	(3.4)	315	(6.2)	350	(4.9)	411	(4.8)	540	(4.1)	595	(4.4)	627	(4.6)	312
OECD average	494	(0.5)	95	(0.3)	473	(0.6)	515	(0.5)	**-42**	(0.6)	330	(1.0)	367	(0.8)	431	(0.7)	562	(0.5)	613	(0.6)	641	(0.6)	311

17 countries with scores below 430 omitted

Note: Values that are statistically significant are indicated in bold

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

A8 Mean score, variation and gender differences in student performance on the non-continuous texts scale

	All students				Gender differences						Percentiles												Difference between 5th & 95th percentile
	Mean score		Standard deviation		Males		Females		Difference		5th		10th		25th		75th		90th		95th		
	Mean	S.E.	S.D.	S.E.	Mean	S.E.	Mean	S.E.	Diff.	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	
Australia	524	(2.3)	99	(1.4)	507	(2.9)	541	(2.7)	**-34**	(3.1)	352	(3.5)	394	(3.5)	461	(2.5)	594	(2.7)	647	(3.4)	677	(4.0)	325
Austria*	472	(3.2)	107	(2.3)	453	(4.1)	491	(4.2)	**-38**	(5.6)	283	(6.5)	324	(6.5)	400	(5.6)	551	(3.4)	604	(3.7)	631	(4.0)	348
Belgium*	511	(2.2)	105	(1.7)	496	(3.5)	526	(2.8)	**-30**	(4.6)	321	(6.9)	368	(4.2)	443	(3.6)	588	(2.4)	637	(2.7)	663	(3.2)	343
*Bulgaria**	421	(7.2)	123	(3.0)	393	(8.0)	451	(6.1)	**-58**	(4.8)	204	(9.2)	255	(10.2)	339	(10.4)	511	(6.6)	573	(6.6)	609	(6.8)	405
Canada	527	(1.6)	92	(0.9)	511	(1.8)	544	(1.9)	**-33**	(2.0)	367	(3.3)	407	(2.9)	468	(2.1)	591	(2.0)	641	(2.2)	671	(2.8)	303
Chile	444	(3.2)	85	(1.9)	436	(4.1)	451	(3.4)	**-15**	(4.1)	298	(5.2)	333	(4.7)	387	(4.4)	502	(3.3)	552	(4.0)	580	(5.4)	282
Chinese Taipei	500	(2.8)	93	(1.9)	483	(4.0)	518	(3.8)	**-36**	(5.6)	337	(6.1)	377	(5.4)	440	(3.9)	566	(3.3)	615	(4.1)	642	(4.7)	305
Croatia	472	(3.0)	90	(1.9)	451	(3.7)	495	(3.9)	**-44**	(4.8)	319	(5.0)	354	(4.2)	412	(4.4)	536	(3.4)	584	(3.6)	613	(4.3)	295
Czech Republic*	474	(3.4)	97	(2.2)	453	(4.5)	498	(3.4)	**-45**	(4.6)	308	(8.0)	350	(6.4)	412	(4.7)	543	(3.9)	597	(3.9)	627	(4.4)	319
Denmark*	493	(2.3)	85	(1.1)	479	(2.8)	506	(2.7)	**-27**	(3.1)	347	(5.2)	381	(3.9)	436	(2.8)	552	(2.6)	599	(3.1)	625	(3.6)	278
Dubai (UAE)	460	(1.3)	111	(1.0)	440	(1.9)	480	(1.8)	**-41**	(2.6)	270	(2.9)	311	(2.4)	383	(1.9)	541	(2.5)	602	(2.9)	635	(3.5)	365
England	506	(2.8)	99	(1.7)	493	(4.4)	519	(3.6)	**-26**	(5.5)	340	(4.3)	380	(3.6)	440	(3.5)	575	(3.8)	631	(4.4)	664	(5.8)	324
*Estonia**	512	(2.7)	91	(2.0)	491	(3.2)	534	(2.8)	**-43**	(2.7)	357	(6.9)	394	(4.9)	454	(3.7)	573	(2.8)	624	(3.2)	654	(3.5)	297
Finland*	535	(2.4)	89	(1.0)	508	(2.6)	562	(2.7)	**-54**	(2.4)	378	(4.4)	417	(3.8)	478	(2.9)	598	(3.0)	645	(2.9)	670	(2.9)	292
France*	498	(3.4)	103	(2.8)	479	(4.3)	517	(3.4)	**-38**	(3.7)	311	(9.7)	360	(7.3)	435	(5.2)	572	(3.8)	621	(4.0)	649	(5.0)	338
Germany*	497	(2.8)	99	(1.8)	478	(3.9)	518	(3.0)	**-40**	(3.9)	319	(6.2)	361	(4.7)	432	(4.5)	570	(3.3)	618	(2.6)	643	(3.2)	323
Greece*	472	(4.3)	95	(2.6)	450	(5.5)	493	(3.5)	**-42**	(4.6)	303	(11.3)	344	(9.2)	412	(6.1)	539	(2.9)	588	(2.7)	615	(3.2)	312
Hong Kong-China	522	(2.3)	85	(1.5)	510	(3.3)	536	(3.1)	**-26**	(4.4)	372	(4.9)	409	(4.7)	471	(3.3)	583	(2.6)	625	(2.8)	649	(3.3)	277
Hungary*	487	(3.3)	92	(2.6)	471	(4.0)	503	(4.0)	**-32**	(4.3)	326	(9.5)	363	(7.2)	427	(4.6)	554	(3.5)	600	(4.0)	625	(4.4)	299
Iceland	499	(1.5)	96	(1.4)	478	(2.3)	519	(2.2)	**-41**	(3.3)	331	(5.4)	371	(4.1)	439	(2.8)	566	(1.7)	616	(3.3)	645	(4.2)	314
Israel	467	(3.9)	120	(2.9)	447	(5.8)	486	(3.7)	**-40**	(5.8)	255	(9.9)	305	(8.0)	388	(5.7)	553	(3.8)	615	(4.1)	649	(4.5)	394
Italy*	476	(1.7)	102	(1.8)	456	(2.5)	498	(2.0)	**-43**	(3.0)	299	(4.2)	342	(3.3)	410	(2.1)	550	(1.7)	601	(1.9)	630	(2.0)	331
Japan	518	(3.5)	99	(3.0)	499	(5.6)	537	(3.9)	**-38**	(6.9)	339	(10.3)	388	(7.1)	457	(4.5)	587	(3.1)	636	(4.2)	665	(5.0)	326
Korea	542	(3.6)	82	(2.4)	527	(5.1)	559	(3.7)	**-32**	(5.9)	399	(6.5)	436	(6.2)	491	(4.7)	599	(3.6)	643	(3.6)	666	(3.9)	267
*Latvia**	487	(3.4)	88	(1.7)	464	(3.8)	510	(3.7)	**-46**	(3.7)	337	(5.3)	371	(4.8)	428	(4.3)	549	(3.4)	596	(3.9)	624	(4.4)	286
Liechtenstein	506	(3.2)	86	(3.8)	491	(5.2)	523	(4.7)	**-32**	(7.6)	354	(13.4)	391	(7.9)	446	(7.3)	573	(6.4)	608	(7.6)	632	(10.8)	278
*Lithuania**	462	(2.6)	91	(1.9)	434	(3.0)	491	(2.6)	**-57**	(2.7)	310	(6.1)	343	(4.2)	401	(3.5)	525	(3.0)	579	(3.4)	607	(4.5)	297
Luxembourg*	472	(1.2)	103	(1.0)	455	(1.9)	489	(1.3)	**-34**	(2.2)	289	(4.1)	334	(3.6)	405	(2.7)	546	(2.0)	597	(2.2)	626	(2.3)	338
Macao-China	481	(1.1)	76	(0.8)	467	(1.3)	495	(1.5)	**-28**	(1.8)	352	(2.5)	381	(2.3)	431	(2.1)	533	(1.4)	576	(2.0)	600	(2.8)	248
Mexico	424	(2.0)	87	(1.2)	415	(2.3)	434	(2.1)	**-20**	(1.9)	278	(3.5)	311	(2.9)	367	(2.4)	485	(2.0)	533	(2.4)	560	(2.4)	283
Netherlands*	514	(5.1)	91	(1.9)	502	(5.1)	527	(5.3)	**-25**	(2.5)	364	(5.1)	395	(5.5)	449	(6.4)	582	(5.4)	632	(4.9)	659	(5.5)	295
New Zealand	532	(2.3)	104	(1.7)	511	(3.6)	555	(2.7)	**-44**	(4.4)	354	(5.6)	394	(4.1)	462	(3.5)	607	(3.0)	662	(3.2)	690	(3.7)	336
Northern Ireland	506	(4.3)	98	(4.2)	491	(8.2)	520	(3.6)	**-29**	(9.5)	339	(14.2)	380	(9.2)	441	(6.7)	573	(3.5)	627	(3.8)	658	(4.6)	319
Norway	498	(2.6)	89	(1.4)	477	(3.0)	519	(2.9)	**-42**	(2.7)	344	(5.4)	381	(4.3)	440	(2.9)	560	(3.3)	608	(3.7)	636	(3.9)	292
Poland*	496	(2.8)	95	(1.6)	473	(3.0)	518	(2.9)	**-46**	(2.5)	333	(6.7)	372	(4.0)	434	(3.6)	562	(3.2)	614	(3.8)	645	(3.4)	311
Portugal*	488	(3.2)	90	(1.7)	471	(3.7)	504	(3.2)	**-33**	(2.7)	333	(5.6)	370	(4.7)	430	(4.2)	550	(3.4)	601	(3.6)	628	(4.4)	295
Republic of Ireland*	496	(3.0)	96	(2.2)	477	(4.3)	516	(3.1)	**-39**	(4.6)	327	(8.1)	372	(5.9)	438	(4.1)	563	(3.0)	611	(3.6)	638	(4.5)	311
*Romania**	424	(4.5)	96	(2.7)	406	(5.3)	442	(4.7)	**-35**	(5.0)	261	(7.2)	298	(7.1)	360	(6.1)	492	(5.1)	544	(4.6)	573	(6.1)	312
Russian Federation	452	(3.9)	98	(2.2)	430	(4.3)	474	(4.0)	**-44**	(3.1)	288	(7.2)	327	(6.0)	387	(4.4)	519	(4.0)	577	(4.7)	612	(5.8)	324
Scotland	511	(3.4)	96	(1.8)	498	(4.9)	524	(3.2)	**-26**	(4.3)	348	(6.3)	386	(5.6)	447	(4.5)	579	(4.3)	634	(5.3)	664	(5.1)	316
Serbia	438	(2.9)	95	(1.8)	418	(3.8)	457	(3.0)	**-39**	(3.5)	275	(5.2)	313	(4.6)	375	(4.3)	503	(3.4)	555	(3.5)	585	(5.2)	310
Shanghai-China	539	(2.4)	84	(1.7)	522	(3.1)	557	(2.4)	**-35**	(3.0)	394	(6.2)	429	(4.6)	486	(3.0)	598	(2.3)	643	(3.4)	668	(3.6)	274
Singapore	539	(1.1)	95	(1.2)	524	(1.6)	553	(1.5)	**-29**	(2.2)	373	(3.1)	410	(3.2)	477	(2.0)	605	(1.9)	656	(2.3)	684	(3.3)	312
Slovak Republic*	471	(2.8)	92	(2.4)	448	(3.9)	495	(3.0)	**-47**	(3.8)	314	(6.5)	350	(5.2)	410	(3.9)	537	(3.1)	587	(3.7)	615	(4.0)	300
Slovenia*	476	(1.1)	88	(0.8)	453	(1.6)	500	(1.5)	**-47**	(2.2)	320	(2.9)	358	(2.6)	418	(2.1)	540	(1.7)	584	(2.4)	609	(2.4)	289
Spain*	473	(2.1)	94	(1.2)	458	(2.5)	487	(2.2)	**-29**	(2.4)	306	(5.1)	348	(3.6)	414	(2.5)	538	(2.1)	586	(2.4)	614	(2.5)	308
Sweden*	498	(2.8)	97	(1.7)	475	(3.0)	521	(3.2)	**-46**	(2.7)	330	(5.2)	372	(4.1)	439	(3.5)	564	(3.3)	618	(3.5)	647	(4.3)	316
Switzerland	505	(2.5)	94	(1.4)	487	(3.0)	524	(2.8)	**-38**	(3.0)	342	(4.8)	378	(4.3)	443	(3.2)	572	(3.3)	622	(3.9)	650	(4.2)	308
Turkey	461	(3.8)	86	(1.9)	444	(4.1)	479	(4.3)	**-35**	(3.9)	313	(6.1)	347	(5.2)	404	(4.1)	522	(4.8)	570	(5.1)	596	(6.4)	283
United Kingdom*	506	(2.3)	99	(1.4)	492	(3.6)	518	(3.0)	**-26**	(4.6)	339	(3.7)	379	(3.0)	440	(2.9)	574	(3.1)	630	(3.8)	663	(5.0)	324
United States	503	(3.5)	94	(1.4)	492	(3.9)	514	(3.9)	**-22**	(3.3)	344	(5.2)	379	(4.2)	438	(4.1)	570	(4.1)	624	(4.2)	654	(4.1)	311
Wales	486	(3.4)	97	(1.6)	472	(4.0)	500	(3.6)	**-28**	(3.5)	320	(6.3)	359	(5.2)	423	(4.1)	554	(3.5)	609	(4.0)	639	(4.7)	319
OECD average	493	(0.5)	95	(0.3)	475	(0.6)	511	(0.5)	**-36**	(0.7)	327	(1.1)	367	(0.9)	431	(0.7)	560	(0.5)	611	(0.6)	639	(0.7)	311

17 countries with scores below 430 omitted

Note: Values that are statistically significant are indicated in bold

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

A9 Significant differences in mean scores on the Access and retrieve scale

	Mean score		significance
	Mean	S.E.	
Shanghai-China	549	2.9	▲
Korea	542	3.6	▲
Finland*	532	2.7	▲
Japan	530	3.8	▲
Hong Kong-China	530	2.7	▲
Singapore	526	1.4	▲
New Zealand	521	2.4	▲
Netherlands*	519	5.1	▲
Canada	517	1.5	▲
Belgium*	513	2.4	▲
Australia	513	2.4	▲
Norway	512	2.8	▲
Liechtenstein	508	4.0	▲
Iceland	507	1.6	▲
Switzerland	505	2.7	▲
Sweden*	505	2.9	▲
*Estonia**	503	3.0	▲
Denmark*	502	2.6	▲
Hungary*	501	3.7	▲
Germany*	501	3.5	▲
Poland*	500	2.8	▲
Republic of Ireland*	498	3.3	▲
Chinese Taipei	496	2.8	▲
OECD average	**495**	**0.5**	▲
Macao-China	493	1.2	▲
United States	492	3.6	▲
France*	492	3.8	▲
Croatia	492	3.1	▲
United Kingdom*	491	2.5	
Slovak Republic*	491	3.0	▲
Slovenia*	489	1.1	▲
Portugal*	488	3.3	▲
Italy*	482	1.8	*NS*
Spain*	480	2.1	*NS*
Czech Republic*	479	3.2	*NS*
Austria*	477	3.2	*NS*
Wales	477	3.6	
*Lithuania**	476	3.0	*NS*
*Latvia**	476	3.6	*NS*
Luxembourg*	471	1.3	*NS*
Russian Federation	469	3.9	*NS*
Greece*	468	4.4	*NS*
Turkey	467	4.1	*NS*
Israel	463	4.1	▼
Dubai (UAE)	458	1.4	▼
Serbia	449	3.1	▼
Chile	444	3.4	▼
Mexico	433	2.1	▼
*Bulgaria**	430	8.3	▼
*Romania**	423	4.7	▼

17 countries with scores below 430 omitted

Simple comparison P-value = 5%

key

▲ significantly higher

NS no significant difference

▼ significantly lower

OECD countries (not italicised)

Countries not in OECD (italicised)

* EU countries

A10 Significant differences in mean scores on the Integrate and interpret scale

	Mean score		significance
	Mean	S.E.	
Shanghai-China	558	2.5	▲
Korea	541	3.4	▲
Finland*	538	2.3	▲
Hong Kong-China	530	2.2	▲
Singapore	525	1.2	▲
Canada	522	1.5	▲
Japan	520	3.5	▲
New Zealand	517	2.4	▲
Australia	513	2.4	▲
Netherlands*	504	5.4	▲
Belgium*	504	2.5	▲
Poland*	503	2.8	▲
Iceland	503	1.5	▲
Norway	502	2.7	▲
Switzerland	502	2.5	▲
Germany*	501	2.8	▲
*Estonia**	500	2.8	▲
Chinese Taipei	499	2.5	▲
Liechtenstein	498	4.0	▲
France*	497	3.6	▲
Hungary*	496	3.2	▲
United States	495	3.7	▲
Sweden*	494	3.0	▲
Republic of Ireland*	494	3.0	▲
OECD average	**493**	**0.5**	▲
Denmark*	492	2.1	▲
United Kingdom*	491	2.4	
Italy*	490	1.6	▲
Slovenia*	489	1.1	▲
Macao-China	488	0.8	▲
Czech Republic*	488	2.9	▲
Portugal*	487	3.0	▲
*Latvia**	484	2.8	▲
Greece*	484	4.0	▲
Slovak Republic*	481	2.5	▲
Spain*	481	2.0	▲
Luxembourg*	475	1.1	*NS*
Israel	473	3.4	*NS*
Croatia	472	2.9	*NS*
Wales	472	3.6	
Austria*	471	2.9	*NS*
*Lithuania**	469	2.4	*NS*
Russian Federation	467	3.1	*NS*
Turkey	459	3.3	▼
Dubai (UAE)	457	1.3	▼
Chile	452	3.1	▼
Serbia	445	2.4	▼
*Bulgaria**	436	6.4	▼
*Romania**	425	4.0	▼
Mexico	418	2.0	▼

key

▲ significantly higher

NS no significant difference

▼ significantly lower

OECD countries (not italicised)

Countries not in OECD (italicised)

*EU countries

17 countries with scores below 430 omitted

Simple comparison P-value = 5%

A11 Significant differences in mean scores on the Reflect and evaluate scale

	Mean score		significance
	Mean	S.E.	
Shanghai-China	557	2.4	▲
Korea	542	3.9	▲
Hong Kong-China	540	2.5	▲
Finland*	536	2.2	▲
Canada	535	1.6	▲
New Zealand	531	2.5	▲
Singapore	529	1.1	▲
Australia	523	2.5	▲
Japan	521	3.9	▲
United States	512	4.0	▲
Netherlands*	510	5.0	▲
Belgium*	505	2.5	▲
Norway	505	2.7	▲
United Kingdom*	503	2.4	
*Estonia**	503	2.6	▲
Republic of Ireland*	502	3.1	▲
Sweden*	502	3.0	▲
Poland*	498	2.8	▲
Liechtenstein	498	3.2	▲
Switzerland	497	2.7	▲
Portugal*	496	3.3	▲
Iceland	496	1.4	▲
France*	495	3.4	▲
OECD average	**494**	**0.5**	▲
Denmark*	493	2.6	▲
Chinese Taipei	493	2.8	▲
*Latvia**	492	3.0	*NS*
Germany*	491	2.8	*NS*
Greece*	489	4.9	*NS*
Hungary*	489	3.3	*NS*
Spain*	483	2.2	*NS*
Wales	483	3.8	
Israel	483	4.0	*NS*
Italy*	482	1.8	*NS*
Macao-China	481	0.8	*NS*
Turkey	473	4.0	*NS*
Croatia	471	3.5	▼
Luxembourg*	471	1.1	▼
Slovenia*	470	1.2	▼
Slovak Republic*	466	2.9	▼
Dubai (UAE)	466	1.1	▼
*Lithuania**	463	2.5	▼
Austria*	463	3.4	▼
Czech Republic*	462	3.1	▼
Chile	452	3.2	▼
Russian Federation	441	3.7	▼
Mexico	432	1.9	▼
Serbia	430	2.6	▼
*Romania**	426	4.5	▼
*Bulgaria**	417	7.1	▼

17 countries with scores below 430 omitted

Simple comparison P-value = 5%

key

▲ significantly higher

NS no significant difference

▼ significantly lower

OECD countries (not italicised)

Countries not in OECD (italicised)

*EU countries

A12 Significant differences in mean scores on the continuous texts scale

	Mean score		significance
	Mean	S.E.	
Shanghai-China	564	2.5	▲
Korea	538	3.5	▲
Hong Kong-China	538	2.3	▲
Finland*	535	2.3	▲
Canada	524	1.5	▲
Singapore	522	1.1	▲
Japan	520	3.6	▲
New Zealand	518	2.4	▲
Australia	513	2.5	▲
Netherlands*	506	5.0	▲
Norway	505	2.6	▲
Belgium*	504	2.4	▲
Poland*	502	2.7	▲
Iceland	501	1.6	▲
United States	500	3.7	▲
Sweden*	499	3.0	▲
Switzerland	498	2.5	▲
*Estonia**	497	2.7	▲
Hungary*	497	3.3	▲
Republic of Ireland*	497	3.3	▲
Chinese Taipei	496	2.6	▲
Denmark*	496	2.1	▲
Germany*	496	2.7	▲
Liechtenstein	495	3.0	▲
OECD average	**494**	**0.5**	▲
France*	492	3.5	▲
Portugal*	492	3.2	▲
United Kingdom*	492	2.4	
Italy*	489	1.6	▲
Macao-China	488	0.9	▲
Greece*	487	4.3	▲
Spain*	484	2.1	▲
Slovenia*	484	1.1	▲
*Latvia**	484	3.0	▲
Slovak Republic*	479	2.6	*NS*
Czech Republic*	479	2.9	*NS*
Croatia	478	2.9	*NS*
Israel	477	3.6	*NS*
Wales	474	3.4	
Luxembourg*	471	1.2	*NS*
*Lithuania**	470	2.5	*NS*
Austria*	470	2.9	*NS*
Turkey	466	3.5	*NS*
Dubai (UAE)	461	1.2	▼
Russian Federation	461	3.1	▼
Chile	453	3.1	▼
Serbia	444	2.3	▼
*Bulgaria**	433	6.8	▼
Mexico	426	2.0	▼
*Romania**	423	4.0	▼

17 countries with scores below 430 omitted

Simple comparison P-value = 5%

key

▲ significantly higher

NS no significant difference

▼ significantly lower

OECD countries (not italicised)

Countries not in OECD (italicised)

*EU countries

A13 Significant differences in mean scores on the non-continuous texts scale

	Mean score		significance
	Mean	S.E.	
Korea	542	3.6	▲
Shanghai-China	539	2.4	▲
Singapore	539	1.1	▲
Finland*	535	2.4	▲
New Zealand	532	2.3	▲
Canada	527	1.6	▲
Australia	524	2.3	▲
Hong Kong-China	522	2.3	▲
Japan	518	3.5	▲
Netherlands*	514	5.1	▲
*Estonia**	512	2.7	▲
Belgium*	511	2.2	▲
United Kingdom*	506	2.3	
Liechtenstein	506	3.2	▲
Switzerland	505	2.5	▲
United States	503	3.5	▲
Chinese Taipei	500	2.8	▲
Iceland	499	1.5	▲
France*	498	3.4	▲
Sweden*	498	2.8	▲
Norway	498	2.6	▲
Germany*	497	2.8	▲
Republic of Ireland*	496	3.0	▲
Poland*	496	2.8	▲
Denmark*	493	2.3	*NS*
OECD average	**493**	**0.5**	*NS*
Portugal*	488	3.2	*NS*
Hungary*	487	3.3	*NS*
*Latvia**	487	3.4	*NS*
Wales	486	3.4	
Macao-China	481	1.1	*NS*
Italy*	476	1.7	▼
Slovenia*	476	1.1	▼
Czech Republic*	474	3.4	▼
Spain*	473	2.1	▼
Austria*	472	3.2	▼
Greece*	472	4.3	▼
Croatia	472	3.0	▼
Luxembourg*	472	1.2	▼
Slovak Republic*	471	2.8	▼
Israel	467	3.9	▼
*Lithuania**	462	2.6	▼
Turkey	461	3.8	▼
Dubai (UAE)	460	1.3	▼
Russian Federation	452	3.9	▼
Chile	444	3.2	▼
Serbia	438	2.9	▼
Mexico	424	2.0	▼
*Romania**	424	4.5	▼
*Bulgaria**	421	7.2	▼

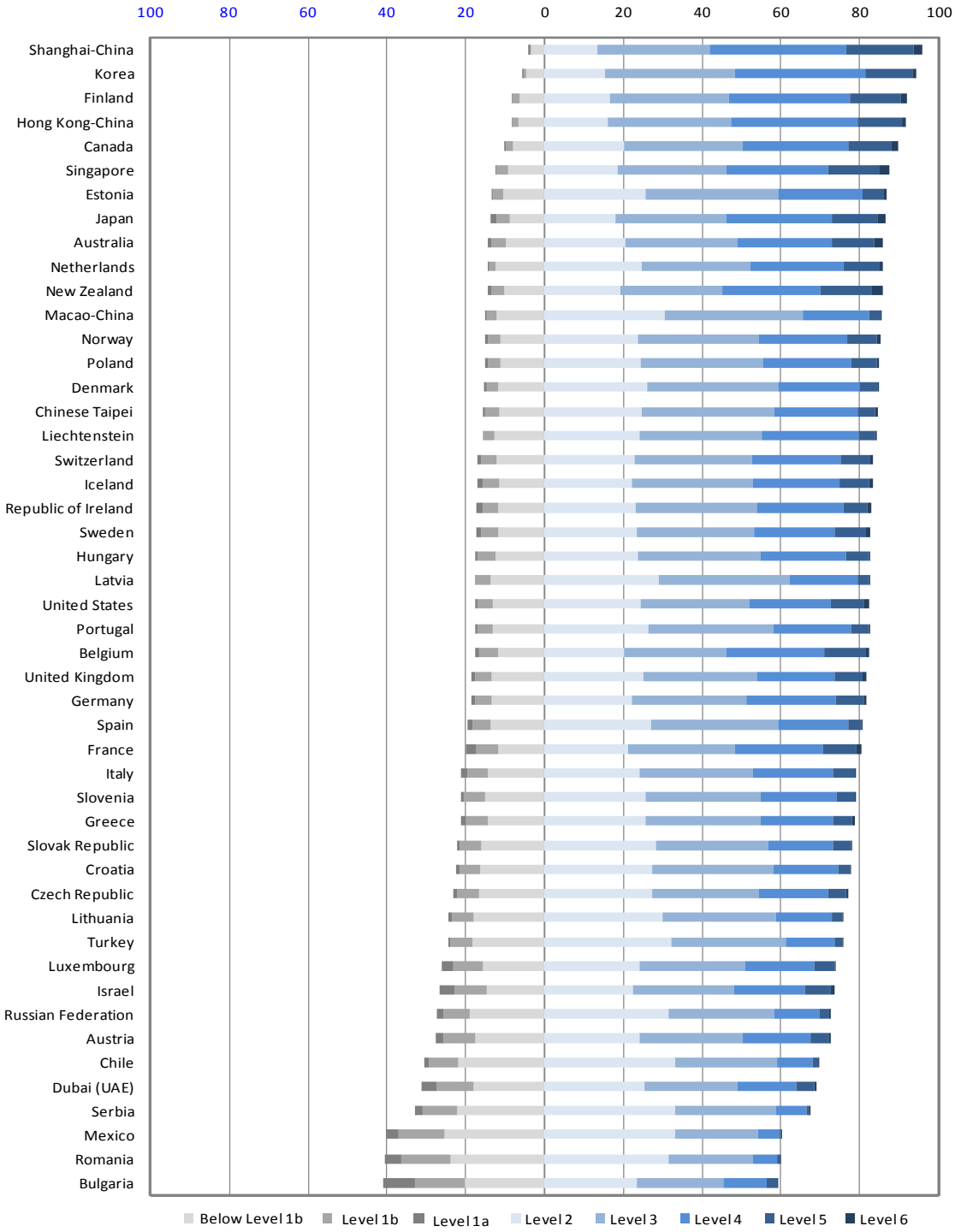
17 countries with scores below 430 omitted
Simple comparison P-value = 5%

key

▲ significantly higher
NS no significant difference
▼ significantly lower

OECD countries (not italicised)
Countries not in OECD (italicised)
*EU countries

A14 Summary of percentage of students at each level of proficiency on the reading scale



Note: Countries are ranked in descending order of the percentage of students at Levels 2, 3, 4, 5 and 6.
Source: OECD PISA 2009 database, Table I.2.1.

17 countries with scores below 430 omitted

A15 Percentage of students at each level of proficiency on the reading scale

	Proficiency levels															
	Below level 1b		Level 1b		Level 1a		Level 2		Level 3		Level 4		Level 5		Level 6	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
Australia	1.0	(0.1)	3.3	(0.3)	10.0	(0.4)	20.4	(0.6)	28.5	(0.7)	24.1	(0.7)	10.7	(0.5)	2.1	(0.3)
Austria*	1.9	(0.4)	8.1	(0.8)	17.5	(1.0)	24.1	(1.0)	26.0	(0.9)	17.4	(0.9)	4.5	(0.4)	0.4	(0.1)
Belgium*	1.1	(0.3)	4.7	(0.5)	11.9	(0.6)	20.3	(0.7)	25.8	(0.9)	24.9	(0.7)	10.1	(0.5)	1.1	(0.2)
*Bulgaria**	8.0	(1.1)	12.9	(1.4)	20.1	(1.4)	23.4	(1.1)	21.8	(1.4)	11.0	(1.1)	2.6	(0.5)	0.2	(0.1)
Canada	0.4	(0.1)	2.0	(0.2)	7.9	(0.3)	20.2	(0.6)	30.0	(0.7)	26.8	(0.6)	11.0	(0.4)	1.8	(0.2)
Chile	1.3	(0.2)	7.4	(0.8)	21.9	(1.0)	33.2	(1.1)	25.6	(1.1)	9.3	(0.7)	1.3	(0.2)	0.0	(0.0)
Chinese Taipei	0.7	(0.2)	3.5	(0.4)	11.4	(0.6)	24.6	(0.8)	33.5	(1.1)	21.0	(1.0)	4.8	(0.8)	0.4	(0.2)
Croatia	1.0	(0.2)	5.0	(0.4)	16.5	(1.0)	27.4	(1.0)	30.6	(1.2)	16.4	(1.0)	3.1	(0.4)	0.1	(0.1)
Czech Republic*	0.8	(0.3)	5.5	(0.6)	16.8	(1.1)	27.4	(1.0)	27.0	(1.0)	17.4	(1.0)	4.7	(0.4)	0.4	(0.1)
Denmark*	0.4	(0.1)	3.1	(0.3)	11.7	(0.7)	26.0	(0.9)	33.1	(1.2)	20.9	(1.1)	4.4	(0.4)	0.3	(0.1)
Dubai (UAE)	3.7	(0.2)	9.4	(0.5)	17.9	(0.5)	25.4	(0.7)	23.5	(0.8)	14.8	(0.7)	4.8	(0.5)	0.5	(0.2)
England	1.0	(0.2)	4.1	(0.4)	13.3	(0.8)	24.7	(0.9)	28.9	(1.0)	19.9	(0.9)	7.1	(0.6)	1.0	(0.2)
*Estonia**	0.3	(0.1)	2.4	(0.4)	10.6	(0.9)	25.6	(1.3)	33.8	(1.0)	21.2	(0.8)	5.4	(0.5)	0.6	(0.2)
Finland*	0.2	(0.1)	1.5	(0.2)	6.4	(0.4)	16.7	(0.6)	30.1	(0.8)	30.6	(0.9)	12.9	(0.7)	1.6	(0.2)
France*	2.3	(0.5)	5.6	(0.5)	11.8	(0.8)	21.1	(1.0)	27.2	(1.0)	22.4	(1.1)	8.5	(0.8)	1.1	(0.3)
Germany*	0.8	(0.2)	4.4	(0.5)	13.3	(0.8)	22.2	(0.9)	28.8	(1.1)	22.8	(0.9)	7.0	(0.6)	0.6	(0.2)
Greece*	1.4	(0.4)	5.6	(0.9)	14.3	(1.1)	25.6	(1.1)	29.3	(1.2)	18.2	(1.0)	5.0	(0.5)	0.6	(0.2)
Hong Kong-China	0.2	(0.1)	1.5	(0.3)	6.6	(0.6)	16.1	(0.8)	31.4	(0.9)	31.8	(0.9)	11.2	(0.7)	1.2	(0.3)
Hungary*	0.6	(0.2)	4.7	(0.8)	12.3	(1.0)	23.8	(1.2)	31.0	(1.3)	21.6	(1.1)	5.8	(0.7)	0.3	(0.1)
Iceland	1.1	(0.2)	4.2	(0.4)	11.5	(0.7)	22.2	(0.8)	30.6	(0.9)	21.9	(0.8)	7.5	(0.6)	1.0	(0.2)
Israel	3.9	(0.7)	8.0	(0.7)	14.7	(0.6)	22.5	(1.0)	25.5	(0.9)	18.1	(0.7)	6.4	(0.5)	1.0	(0.2)
Italy*	1.4	(0.2)	5.2	(0.3)	14.4	(0.5)	24.0	(0.5)	28.9	(0.6)	20.2	(0.5)	5.4	(0.3)	0.4	(0.1)
Japan	1.3	(0.4)	3.4	(0.5)	8.9	(0.7)	18.0	(0.8)	28.0	(0.9)	27.0	(0.9)	11.5	(0.7)	1.9	(0.4)
Korea	0.2	(0.2)	0.9	(0.3)	4.7	(0.6)	15.4	(1.0)	33.0	(1.2)	32.9	(1.4)	11.9	(1.0)	1.0	(0.2)
*Latvia**	0.4	(0.2)	3.3	(0.6)	13.9	(1.0)	28.8	(1.5)	33.5	(1.2)	17.2	(1.0)	2.9	(0.4)	0.1	
Liechtenstein	0.0	–	2.8	(1.2)	12.8	(1.8)	24.0	(2.8)	31.1	(2.8)	24.6	(2.3)	4.2	(1.4)	0.4	
*Lithuania**	0.9	(0.3)	5.5	(0.6)	17.9	(0.9)	30.0	(1.0)	28.6	(0.9)	14.1	(0.8)	2.8	(0.4)	0.1	(0.1)
Luxembourg*	3.1	(0.3)	7.3	(0.4)	15.7	(0.6)	24.0	(0.7)	27.0	(0.6)	17.3	(0.6)	5.2	(0.4)	0.5	(0.2)
Macao-China	0.3	(0.1)	2.6	(0.3)	12.0	(0.4)	30.6	(0.6)	34.8	(0.7)	16.9	(0.5)	2.8	(0.2)	0.1	(0.1)
Mexico	3.2	(0.3)	11.4	(0.5)	25.5	(0.6)	33.0	(0.6)	21.2	(0.6)	5.3	(0.4)	0.4	(0.1)	0.0	(0.0)
Netherlands*	0.1	(0.1)	1.8	(0.3)	12.5	(1.4)	24.7	(1.5)	27.6	(1.2)	23.5	(1.7)	9.1	(1.0)	0.7	(0.2)
New Zealand	0.9	(0.2)	3.2	(0.4)	10.2	(0.6)	19.3	(0.8)	25.8	(0.8)	24.8	(0.8)	12.9	(0.8)	2.9	(0.4)
Northern Ireland	0.9	(0.5)	3.9	(0.9)	12.7	(1.1)	23.8	(1.3)	27.8	(1.5)	21.6	(1.2)	7.9	(0.7)	1.4	(0.3)
Norway	0.5	(0.1)	3.4	(0.4)	11.0	(0.7)	23.6	(0.8)	30.9	(0.9)	22.1	(1.2)	7.6	(0.9)	0.8	(0.2)
Poland*	0.6	(0.1)	3.1	(0.3)	11.3	(0.7)	24.5	(1.1)	31.0	(1.0)	22.3	(1.0)	6.5	(0.5)	0.7	(0.1)
Portugal*	0.6	(0.1)	4.0	(0.4)	13.0	(1.0)	26.4	(1.1)	31.6	(1.1)	19.6	(0.9)	4.6	(0.5)	0.2	(0.1)
Republic of Ireland*	1.5	(0.4)	3.9	(0.5)	11.8	(0.7)	23.3	(1.0)	30.6	(0.9)	21.9	(0.9)	6.3	(0.5)	0.7	(0.2)
*Romania**	4.1	(0.7)	12.7	(1.1)	23.6	(1.2)	31.6	(1.3)	21.2	(1.3)	6.1	(0.7)	0.7	(0.2)	0.0	
Russian Federation	1.6	(0.3)	6.8	(0.6)	19.0	(0.8)	31.6	(1.0)	26.8	(0.9)	11.1	(0.7)	2.8	(0.4)	0.3	(0.1)
Scotland	0.8	(0.3)	3.4	(0.6)	12.0	(0.9)	24.9	(1.0)	29.2	(0.9)	20.4	(1.1)	8.0	(0.9)	1.2	(0.3)
Serbia	2.0	(0.4)	8.8	(0.7)	22.1	(0.9)	33.2	(1.0)	25.3	(1.0)	7.9	(0.6)	0.8	(0.2)	0.0	(0.0)
Shanghai-China	0.1	(0.0)	0.6	(0.1)	3.4	(0.5)	13.3	(0.9)	28.5	(1.2)	34.7	(1.0)	17.0	(1.0)	2.4	(0.4)
Singapore	0.4	(0.1)	2.7	(0.3)	9.3	(0.5)	18.5	(0.6)	27.6	(0.8)	25.7	(0.7)	13.1	(0.5)	2.6	(0.3)
Slovak Republic*	0.8	(0.3)	5.6	(0.6)	15.9	(0.8)	28.1	(1.0)	28.5	(1.1)	16.7	(0.8)	4.2	(0.5)	0.3	(0.1)
Slovenia*	0.8	(0.1)	5.2	(0.3)	15.2	(0.5)	25.6	(0.7)	29.2	(0.9)	19.3	(0.8)	4.3	(0.5)	0.3	(0.1)
Spain*	1.2	(0.2)	4.7	(0.4)	13.6	(0.6)	26.8	(0.8)	32.6	(1.0)	17.7	(0.7)	3.2	(0.3)	0.2	(0.1)
Sweden*	1.5	(0.3)	4.3	(0.4)	11.7	(0.7)	23.5	(1.0)	29.8	(1.0)	20.3	(0.9)	7.7	(0.6)	1.3	(0.3)
Switzerland	0.7	(0.2)	4.1	(0.4)	12.1	(0.6)	22.7	(0.7)	29.7	(0.8)	22.6	(0.8)	7.4	(0.7)	0.7	(0.2)
Turkey	0.8	(0.2)	5.6	(0.6)	18.1	(1.0)	32.2	(1.2)	29.1	(1.1)	12.4	(1.1)	1.8	(0.4)	0.0	(0.0)
United Kingdom*	1.0	(0.2)	4.1	(0.4)	13.4	(0.6)	24.9	(0.7)	28.8	(0.8)	19.8	(0.8)	7.0	(0.5)	1.0	(0.2)
United States	0.6	(0.1)	4.0	(0.4)	13.1	(0.8)	24.4	(0.9)	27.6	(0.8)	20.6	(0.9)	8.4	(0.8)	1.5	(0.4)
Wales	1.4	(0.3)	5.4	(0.6)	16.3	(0.9)	28.0	(1.2)	28.2	(1.3)	15.8	(1.0)	4.4	(0.5)	0.6	(0.2)
OECD average	1.1	(0.0)	4.6	(0.1)	13.1	(0.1)	24.0	(0.2)	28.9	(0.2)	20.7	(0.2)	6.8	(0.1)	0.8	(0.0)

17 countries with scores below 430 omitted

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

Appendix B

B1 Significant differences in mean scores on the mathematics scale

	Mean score		significance
	Mean	S.E.	
Shanghai-China	600	2.8	▲
Singapore	562	1.4	▲
Hong Kong-China	555	2.7	▲
Korea	546	4.0	▲
Chinese Taipei	543	3.4	▲
Finland*	541	2.2	▲
Liechtenstein	536	4.1	▲
Switzerland	534	3.3	▲
Japan	529	3.3	▲
Canada	527	1.6	▲
Netherlands*	526	4.7	▲
Macao-China	525	0.9	▲
New Zealand	519	2.3	▲
Belgium*	515	2.3	▲
Australia	514	2.5	▲
Germany*	513	2.9	▲
*Estonia**	512	2.6	▲
Iceland	507	1.4	▲
Denmark*	503	2.6	▲
Slovenia*	501	1.2	▲
Norway	498	2.4	▲
France*	497	3.1	▲
Slovak Republic*	497	3.1	▲
OECD average	**496**	**0.5**	▲
Austria*	496	2.7	▲
Poland*	495	2.8	▲
Sweden*	494	2.9	▲
Czech Republic*	493	2.8	▲
United Kingdom*	492	2.4	
Hungary*	490	3.5	▲
Luxembourg*	489	1.2	▲
United States	487	3.6	▲
Republic of Ireland*	487	2.5	▲
Portugal*	487	2.9	▲
Spain*	483	2.1	▲
Italy*	483	1.9	▲
*Latvia**	482	3.1	▲
*Lithuania**	477	2.6	*NS*
Wales	472	3.0	
Russian Federation	468	3.3	*NS*
Greece*	466	3.9	*NS*
Croatia	460	3.1	▼
Dubai (UAE)	453	1.1	▼
Israel	447	3.3	▼
Turkey	445	4.4	▼
Serbia	442	2.9	▼
Azerbaijan	431	2.8	▼
*Bulgaria**	428	5.9	▼
*Romania**	427	3.4	▼
Chile	421	3.1	▼
Mexico	419	1.8	▼

16 countries with scores below 430 omitted

Simple comparison P-value = 5%

key

▲ significantly higher

NS no significant difference

▼ significantly lower

OECD countries (not italicised)

Countries not in OECD (italicised)

*EU countries

B2 Mean score, variation and gender differences in student performance on the mathematics scale

	All students				Gender differences						Percentiles										difference between 5th & 95th percentile
	Mean score		Standard deviation		Males		Females		Difference		5th		10th		25th		75th		90th		95th		
	Mean	S.E.	S.D.	S.E.	Mean	S.E.	Mean	S.E.	Diff.	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	
Australia	514	(2.5)	94	(1.4)	519	(3.0)	509	(2.8)	**10**	(2.9)	357	(3.3)	392	(2.8)	451	(2.5)	580	(3.1)	634	(3.9)	665	(5.0)	308
Austria*	496	(2.7)	96	(2.0)	506	(3.4)	486	(4.0)	**19**	(5.1)	338	(6.6)	370	(4.4)	425	(3.5)	566	(3.5)	620	(3.5)	650	(3.5)	312
Azerbaijan	431	(2.8)	64	(2.2)	435	(3.1)	427	(3.0)	**8**	(2.7)	334	(3.0)	354	(2.7)	387	(2.9)	469	(3.2)	512	(5.2)	541	(7.0)	207
Belgium*	515	(2.3)	104	(1.8)	526	(3.3)	504	(3.0)	**22**	(4.3)	335	(5.3)	373	(4.9)	444	(3.1)	593	(2.4)	646	(3.0)	675	(3.2)	340
*Bulgaria**	428	(5.9)	99	(2.8)	426	(6.2)	430	(6.0)	-4	(3.7)	269	(6.9)	302	(5.8)	359	(6.2)	496	(6.6)	555	(9.0)	593	(12.3)	324
Canada	527	(1.6)	88	(1.0)	533	(2.0)	521	(1.7)	**12**	(1.8)	379	(3.0)	413	(2.7)	468	(2.0)	588	(1.9)	638	(2.2)	665	(2.2)	286
Chile	421	(3.1)	80	(1.7)	431	(3.7)	410	(3.6)	**21**	(4.1)	293	(4.6)	322	(3.8)	366	(3.1)	473	(4.2)	527	(5.1)	559	(5.8)	266
Chinese Taipei	543	(3.4)	105	(2.3)	546	(4.8)	541	(4.8)	5	(6.8)	366	(5.0)	405	(3.8)	471	(3.6)	618	(4.6)	675	(5.4)	709	(6.6)	342
Croatia	460	(3.1)	88	(1.8)	465	(3.6)	454	(3.9)	**11**	(4.4)	315	(4.8)	347	(4.1)	399	(3.5)	521	(3.8)	574	(5.4)	606	(5.6)	292
Czech Republic*	493	(2.8)	93	(1.8)	495	(3.9)	490	(3.0)	5	(4.1)	342	(5.6)	374	(4.3)	428	(3.5)	557	(3.8)	615	(4.3)	649	(4.7)	308
Denmark*	503	(2.6)	87	(1.3)	511	(3.0)	495	(2.9)	**16**	(2.7)	358	(4.4)	390	(4.0)	445	(3.1)	564	(3.3)	614	(3.4)	644	(4.6)	286
Dubai (UAE)	453	(1.1)	99	(0.9)	454	(1.5)	451	(1.6)	2	(2.2)	294	(3.1)	326	(2.6)	381	(2.3)	523	(2.1)	584	(3.3)	619	(3.6)	325
England	493	(2.9)	87	(1.5)	504	(3.9)	483	(3.9)	**21**	(5.3)	349	(4.3)	381	(4.1)	435	(3.6)	552	(3.9)	606	(4.5)	634	(3.9)	285
*Estonia**	512	(2.6)	81	(1.6)	516	(2.9)	508	(2.9)	**9**	(2.6)	378	(6.0)	409	(3.5)	458	(3.7)	567	(2.7)	616	(3.6)	643	(3.6)	265
Finland*	541	(2.2)	82	(1.1)	542	(2.5)	539	(2.5)	3	(2.6)	399	(4.4)	431	(3.7)	487	(3.0)	599	(2.5)	644	(2.6)	669	(3.6)	270
France*	497	(3.1)	101	(2.1)	505	(3.8)	489	(3.4)	**16**	(3.8)	321	(5.9)	361	(6.3)	429	(4.8)	570	(3.7)	622	(3.9)	652	(5.4)	331
Germany*	513	(2.9)	98	(1.7)	520	(3.6)	505	(3.3)	**16**	(3.9)	347	(5.0)	380	(4.7)	443	(4.4)	585	(3.1)	638	(3.5)	666	(3.7)	319
Greece*	466	(3.9)	89	(2.0)	473	(5.4)	459	(3.3)	**14**	(4.2)	319	(7.3)	352	(5.9)	406	(4.4)	527	(3.6)	580	(4.1)	613	(4.4)	294
Hong Kong-China	555	(2.7)	95	(1.8)	561	(4.2)	547	(3.4)	**14**	(5.6)	390	(5.1)	428	(4.9)	492	(3.5)	622	(3.1)	673	(3.9)	703	(4.7)	313
Hungary*	490	(3.5)	92	(2.8)	496	(4.2)	484	(3.9)	**12**	(4.5)	334	(8.4)	370	(7.1)	428	(4.5)	554	(4.5)	608	(5.6)	637	(5.6)	303
Iceland	507	(1.4)	91	(1.2)	508	(2.0)	505	(1.9)	3	(2.8)	352	(4.1)	388	(3.4)	447	(2.0)	569	(2.0)	623	(2.8)	652	(3.3)	300
Israel	447	(3.3)	104	(2.4)	451	(4.7)	443	(3.3)	8	(4.7)	272	(6.7)	310	(6.1)	374	(4.6)	520	(4.2)	581	(5.2)	615	(5.2)	343
Italy*	483	(1.9)	93	(1.7)	490	(2.3)	475	(2.2)	**15**	(2.7)	330	(3.1)	363	(2.4)	420	(1.9)	548	(2.5)	602	(2.5)	632	(2.8)	302
Japan	529	(3.3)	94	(2.2)	534	(5.3)	524	(3.9)	9	(6.5)	370	(6.4)	407	(5.4)	468	(4.4)	595	(3.7)	648	(4.8)	677	(5.4)	308
Korea	546	(4.0)	89	(2.5)	548	(6.2)	544	(4.5)	3	(7.4)	397	(8.4)	430	(6.8)	486	(5.3)	609	(4.3)	659	(4.6)	689	(6.5)	292
*Latvia**	482	(3.1)	79	(1.4)	483	(3.5)	481	(3.4)	2	(3.2)	352	(4.9)	379	(4.5)	427	(3.7)	537	(3.8)	584	(3.8)	612	(3.7)	259
Liechtenstein	536	(4.1)	88	(4.4)	547	(5.2)	523	(5.9)	**24**	(7.6)	384	(17.8)	421	(8.9)	484	(7.9)	593	(5.4)	637	(11.4)	670	(14.9)	286
*Lithuania**	477	(2.6)	88	(1.8)	474	(3.1)	480	(3.0)	**-6**	(3.0)	332	(5.3)	363	(4.2)	417	(3.0)	537	(3.1)	590	(4.0)	621	(5.4)	290
Luxembourg*	489	(1.2)	98	(1.2)	499	(2.0)	479	(1.3)	**19**	(2.4)	324	(3.9)	360	(3.1)	423	(1.7)	560	(2.2)	613	(2.5)	643	(2.5)	319
Macao-China	525	(0.9)	85	(0.9)	531	(1.3)	520	(1.4)	**11**	(2.0)	382	(2.6)	415	(2.7)	468	(1.6)	584	(1.3)	634	(1.6)	663	(2.5)	281
Mexico	419	(1.8)	79	(1.1)	425	(2.1)	412	(1.9)	**14**	(1.5)	289	(3.2)	318	(2.6)	366	(2.2)	472	(2.1)	520	(2.8)	547	(3.3)	259
Netherlands*	526	(4.7)	89	(1.7)	534	(4.8)	517	(5.1)	**17**	(2.4)	378	(5.6)	406	(5.6)	460	(6.8)	593	(4.4)	640	(4.4)	665	(3.9)	287
New Zealand	519	(2.3)	96	(1.6)	523	(3.2)	515	(2.9)	8	(4.1)	355	(4.9)	392	(4.4)	454	(2.8)	589	(3.1)	642	(3.9)	671	(3.4)	316
Northern Ireland	492	(3.1)	89	(2.1)	501	(5.9)	484	(4.0)	**17**	(7.8)	348	(4.2)	378	(4.6)	429	(4.1)	557	(3.6)	608	(5.1)	637	(5.2)	289
Norway	498	(2.4)	85	(1.2)	500	(2.7)	495	(2.8)	5	(2.7)	354	(4.1)	387	(3.6)	441	(3.2)	557	(2.9)	608	(3.4)	636	(4.0)	283
Poland*	495	(2.8)	88	(1.4)	497	(3.0)	493	(3.2)	3	(2.6)	348	(5.2)	380	(3.8)	434	(3.3)	557	(3.2)	609	(4.1)	638	(4.6)	290
Portugal*	487	(2.9)	91	(1.5)	493	(3.3)	481	(3.1)	**12**	(2.5)	334	(3.8)	367	(3.5)	424	(3.4)	551	(3.4)	605	(4.4)	635	(5.1)	301
Republic of Ireland*	487	(2.5)	86	(1.6)	491	(3.4)	483	(3.0)	8	(3.9)	338	(5.7)	376	(4.4)	432	(3.1)	548	(2.8)	591	(3.1)	617	(4.3)	280
*Romania**	427	(3.4)	79	(2.1)	429	(3.9)	425	(3.8)	3	(3.5)	299	(4.4)	326	(4.1)	372	(4.0)	481	(3.6)	530	(5.4)	560	(6.5)	260
Russian Federation	468	(3.3)	85	(2.1)	469	(3.7)	467	(3.5)	2	(2.8)	329	(5.1)	360	(4.5)	411	(4.2)	524	(3.8)	576	(5.3)	609	(7.2)	280
Scotland	499	(3.3)	93	(1.8)	506	(4.5)	492	(3.5)	**14**	(4.8)	348	(5.1)	381	(5.2)	436	(3.8)	563	(4.9)	619	(5.0)	651	(6.0)	302
Serbia	442	(2.9)	91	(1.9)	448	(3.8)	437	(3.2)	**12**	(4.0)	295	(4.8)	327	(4.3)	380	(3.7)	504	(3.2)	560	(4.3)	592	(5.3)	298
Shanghai-China	600	(2.8)	103	(2.1)	599	(3.7)	601	(3.1)	-1	(4.0)	421	(7.1)	462	(5.0)	531	(4.0)	674	(3.3)	726	(4.2)	757	(4.6)	336
Singapore	562	(1.4)	104	(1.2)	565	(1.9)	559	(2.0)	**5**	(2.5)	383	(3.0)	422	(4.1)	490	(2.9)	638	(2.0)	693	(2.5)	725	(3.8)	342
Slovak Republic*	497	(3.1)	96	(2.4)	498	(3.7)	495	(3.4)	3	(3.6)	342	(6.3)	376	(4.7)	432	(3.7)	561	(3.9)	621	(5.4)	654	(6.4)	311
Slovenia*	501	(1.2)	95	(0.9)	502	(1.8)	501	(1.7)	1	(2.6)	345	(3.6)	379	(2.4)	435	(2.5)	569	(2.3)	628	(3.5)	659	(3.6)	314
Spain*	483	(2.1)	91	(1.1)	493	(2.3)	474	(2.5)	**19**	(2.2)	328	(4.0)	364	(2.9)	424	(2.5)	546	(2.3)	597	(2.3)	625	(2.9)	298
Sweden*	494	(2.9)	94	(1.3)	493	(3.1)	495	(3.3)	-2	(2.7)	339	(4.4)	374	(4.2)	432	(3.1)	560	(3.3)	613	(3.9)	643	(4.1)	304
Switzerland	534	(3.3)	99	(1.6)	544	(3.7)	524	(3.4)	**20**	(3.0)	363	(4.8)	401	(3.6)	468	(4.2)	604	(3.9)	658	(4.1)	689	(4.8)	326
Turkey	445	(4.4)	93	(3.0)	451	(4.6)	440	(5.6)	**11**	(5.1)	304	(5.2)	331	(3.6)	378	(3.8)	506	(6.3)	574	(9.0)	613	(12.2)	310
United Kingdom*	492	(2.4)	87	(1.2)	503	(3.2)	482	(3.3)	**20**	(4.4)	348	(3.4)	380	(3.1)	434	(3.0)	552	(3.2)	606	(3.9)	635	(3.2)	287
United States	487	(3.6)	91	(1.6)	497	(4.0)	477	(3.8)	**20**	(3.2)	337	(4.3)	368	(4.3)	425	(3.9)	551	(4.9)	607	(4.6)	637	(5.9)	300
Wales	472	(3.0)	82	(1.5)	482	(3.6)	462	(3.2)	**20**	(3.3)	336	(5.3)	366	(4.6)	417	(3.4)	528	(3.9)	578	(4.1)	607	(4.5)	271
OECD average	496	(0.5)	92	(0.3)	501	(0.6)	490	(0.6)	**12**	(0.6)	343	(0.9)	376	(0.7)	433	(0.6)	560	(0.6)	613	(0.7)	643	(0.8)	300

16 countries with scores below 430 omitted

Note: Values that are statistically significant are indicated in bold

OECD countries (not italicised)

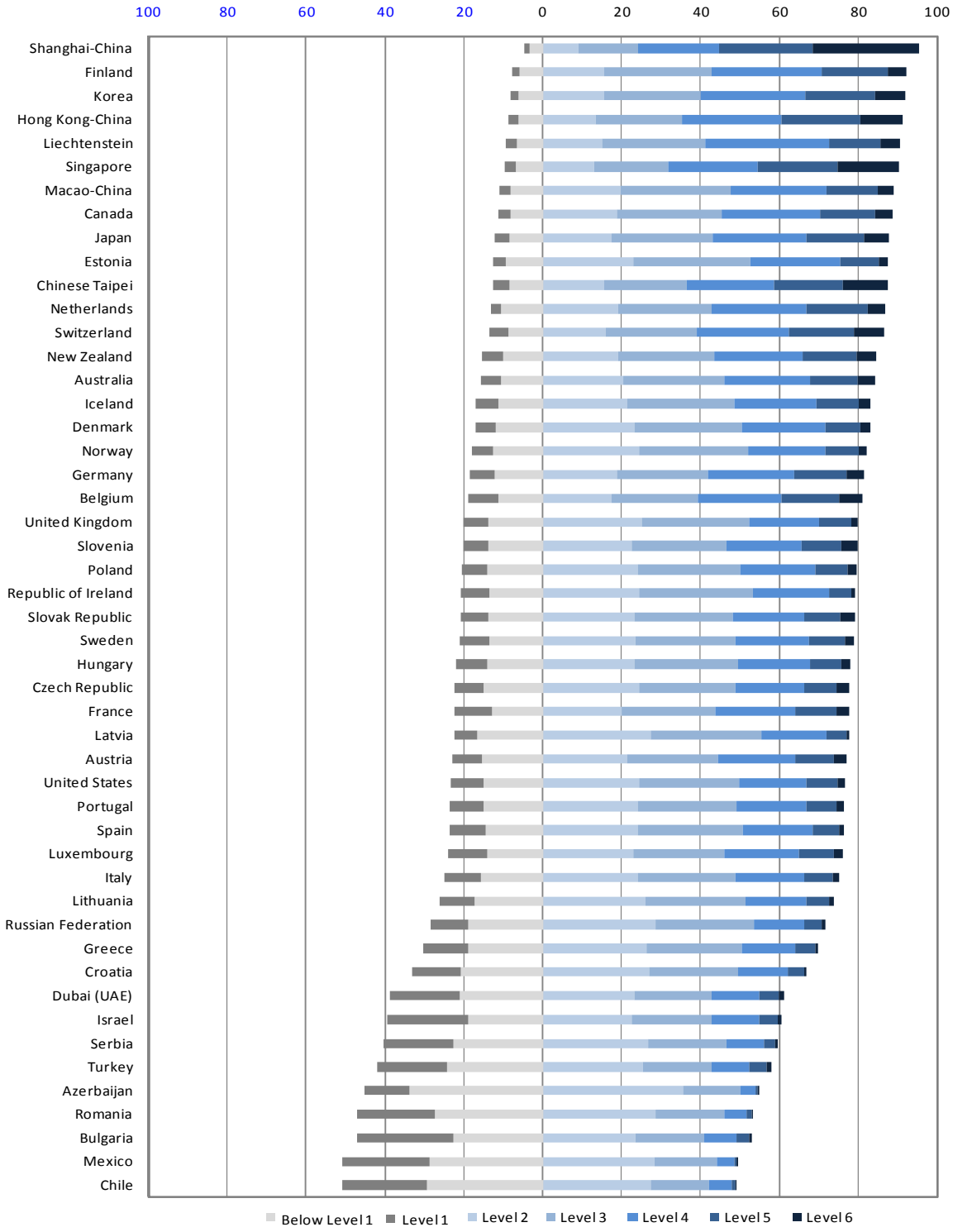
Countries not in OECD (italicised)

*EU countries

B3 Summary descriptions for the six levels of proficiency in mathematics

Level	What students can typically do
6	At Level 6 students can conceptualise, generalise, and utilise information based on their investigations and modelling of complex problem situations. They can link different information sources and representations and flexibly translate among them. Students at this level are capable of advanced mathematical thinking and reasoning. These students can apply this insight and understandings along with a mastery of symbolic and formal mathematical operations and relationships to develop new approaches and strategies for attacking novel situations. Students at this level can formulate and precisely communicate their actions and reflections regarding their findings, interpretations, arguments, and the appropriateness of these to the original situations.
5	At Level 5 students can develop and work with models for complex situations, identifying constraints and specifying assumptions. They can select, compare, and evaluate appropriate problem solving strategies for dealing with complex problems related to these models. Students at this level can work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterisations, and insight pertaining to these situations. They can reflect on their actions and formulate and communicate their interpretations and reasoning.
4	At Level 4 students can work effectively with explicit models for complex concrete situations that may involve constraints or call for making assumptions. They can select and integrate different representations, including symbolic, linking them directly to aspects of real-world situations. Students at this level can utilise well-developed skills and reason flexibly, with some insight, in these contexts. They can construct and communicate explanations and arguments based on their interpretations, arguments, and actions.
3	At Level 3 students can execute clearly described procedures, including those that require sequential decisions. They can select and apply simple problem solving strategies. Students at this level can interpret and use representations based on different information sources and reason directly from them. They can develop short communications reporting their interpretations, results and reasoning.
2	At Level 2 students can interpret and recognise situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode. Students at this level can employ basic algorithms, formulae, procedures, or conventions. They are capable of direct reasoning and making literal interpretations of the results.
1	At Level 1 students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and to carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are obvious and follow immediately from the given stimuli.

B4 Summary of percentage of students at each level of proficiency on the mathematics scale



Note: Countries are ranked in descending order of the percentage of students at Levels 2, 3, 4, 5 and 6.
Source: OECD PISA 2009 database, Table I.3.1.

16 countries with scores below 430 omitted

B5 Percentage of students at each proficiency level on the mathematics scale

	Proficiency levels													
	Below Level 1		Level 1		Level 2		Level 3		Level 4		Level 5		Level 6	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
Australia	5.1	(0.3)	10.8	(0.5)	20.3	(0.6)	25.8	(0.5)	21.7	(0.6)	11.9	(0.5)	4.5	(0.6)
Austria*	7.8	(0.7)	15.4	(0.9)	21.2	(0.9)	23.0	(0.9)	19.6	(0.9)	9.9	(0.7)	3.0	(0.3)
Azerbaijan	11.5	(1.0)	33.8	(1.2)	35.3	(1.3)	14.8	(1.0)	3.6	(0.5)	0.9	(0.3)	0.2	(0.1)
Belgium*	7.7	(0.6)	11.3	(0.5)	17.5	(0.7)	21.8	(0.7)	21.3	(0.8)	14.6	(0.6)	5.8	(0.4)
*Bulgaria**	24.5	(1.9)	22.7	(1.1)	23.4	(1.1)	17.5	(1.4)	8.2	(0.9)	3.0	(0.7)	0.8	(0.4)
Canada	3.1	(0.3)	8.3	(0.4)	18.8	(0.5)	26.5	(0.9)	25.0	(0.7)	13.9	(0.5)	4.4	(0.3)
Chile	21.7	(1.2)	29.4	(1.1)	27.3	(1.0)	14.8	(1.0)	5.6	(0.6)	1.2	(0.3)	0.1	(0.1)
Chinese Taipei	4.2	(0.5)	8.6	(0.6)	15.5	(0.7)	20.9	(0.9)	22.2	(0.9)	17.2	(0.9)	11.3	(1.2)
Croatia	12.4	(0.8)	20.8	(0.9)	26.7	(0.8)	22.7	(1.0)	12.5	(0.8)	4.3	(0.5)	0.6	(0.2)
Czech Republic*	7.0	(0.8)	15.3	(0.8)	24.2	(1.0)	24.4	(1.1)	17.4	(0.8)	8.5	(0.6)	3.2	(0.4)
Denmark*	4.9	(0.5)	12.1	(0.8)	23.0	(0.9)	27.4	(1.1)	21.0	(0.9)	9.1	(0.8)	2.5	(0.5)
Dubai (UAE)	17.6	(0.5)	21.2	(0.6)	23.0	(0.8)	19.6	(0.6)	12.1	(0.6)	5.3	(0.4)	1.2	(0.2)
England	6.1	(0.6)	13.7	(0.9)	24.8	(1.1)	27.5	(1.3)	18.0	(1.2)	8.2	(0.7)	1.7	(0.3)
*Estonia**	3.0	(0.4)	9.6	(0.7)	22.7	(0.9)	29.9	(0.9)	22.7	(0.8)	9.8	(0.8)	2.2	(0.4)
Finland*	1.7	(0.3)	6.1	(0.5)	15.6	(0.8)	27.1	(1.0)	27.8	(0.9)	16.7	(0.8)	4.9	(0.5)
France*	9.5	(0.9)	13.1	(1.1)	19.9	(0.9)	23.8	(1.1)	20.1	(1.0)	10.4	(0.7)	3.3	(0.5)
Germany*	6.4	(0.6)	12.2	(0.7)	18.8	(0.9)	23.1	(0.9)	21.7	(0.9)	13.2	(0.9)	4.6	(0.5)
Greece*	11.3	(1.2)	19.1	(1.0)	26.4	(1.2)	24.0	(1.1)	13.6	(0.8)	4.9	(0.6)	0.8	(0.2)
Hong Kong-China	2.6	(0.4)	6.2	(0.5)	13.2	(0.7)	21.9	(0.8)	25.4	(0.9)	19.9	(0.8)	10.8	(0.8)
Hungary*	8.1	(1.0)	14.2	(0.9)	23.2	(1.2)	26.0	(1.2)	18.4	(1.0)	8.1	(0.8)	2.0	(0.5)
Iceland	5.7	(0.4)	11.3	(0.5)	21.3	(0.9)	27.3	(0.9)	20.9	(0.9)	10.5	(0.7)	3.1	(0.4)
Israel	20.5	(1.2)	18.9	(0.9)	22.5	(0.9)	20.1	(0.9)	12.0	(0.7)	4.7	(0.5)	1.2	(0.3)
Italy*	9.1	(0.4)	15.9	(0.5)	24.2	(0.6)	24.6	(0.5)	17.3	(0.6)	7.4	(0.4)	1.6	(0.1)
Japan	4.0	(0.6)	8.5	(0.6)	17.4	(0.9)	25.7	(1.1)	23.5	(1.0)	14.7	(0.9)	6.2	(0.8)
Korea	1.9	(0.5)	6.2	(0.7)	15.6	(1.0)	24.4	(1.2)	26.3	(1.3)	17.7	(1.0)	7.8	(1.0)
*Latvia**	5.8	(0.7)	16.7	(1.1)	27.2	(1.0)	28.2	(1.1)	16.4	(1.0)	5.1	(0.5)	0.6	(0.1)
Liechtenstein	3.0	(1.0)	6.5	(1.6)	15.0	(2.2)	26.2	(2.3)	31.2	(3.3)	13.0	(2.4)	5.0	(1.4)
*Lithuania**	9.0	(0.8)	17.3	(0.8)	26.1	(1.1)	25.3	(1.0)	15.4	(0.8)	5.7	(0.6)	1.3	(0.3)
Luxembourg*	9.6	(0.5)	14.4	(0.6)	22.7	(0.7)	23.1	(1.0)	19.0	(0.8)	9.0	(0.6)	2.3	(0.4)
Macao-China	2.8	(0.3)	8.2	(0.5)	19.6	(0.6)	27.8	(0.9)	24.5	(0.8)	12.8	(0.4)	4.3	(0.3)
Mexico	21.9	(0.8)	28.9	(0.6)	28.3	(0.6)	15.6	(0.6)	4.7	(0.4)	0.7	(0.1)	0.0	(0.0)
Netherlands*	2.8	(0.6)	10.6	(1.3)	19.0	(1.4)	23.9	(1.0)	23.9	(1.2)	15.4	(1.2)	4.4	(0.5)
New Zealand	5.3	(0.5)	10.2	(0.5)	19.1	(0.8)	24.4	(0.9)	22.2	(1.0)	13.6	(0.7)	5.3	(0.5)
Northern Ireland	6.5	(0.8)	14.9	(1.1)	24.6	(1.2)	24.9	(1.5)	18.9	(1.0)	8.5	(0.9)	1.8	(0.4)
Norway	5.5	(0.5)	12.7	(0.8)	24.3	(0.9)	27.5	(1.0)	19.7	(0.9)	8.4	(0.6)	1.8	(0.3)
Poland*	6.1	(0.5)	14.4	(0.7)	24.0	(0.9)	26.1	(0.8)	19.0	(0.8)	8.2	(0.6)	2.2	(0.4)
Portugal*	8.4	(0.6)	15.3	(0.8)	23.9	(0.9)	25.0	(1.0)	17.7	(0.8)	7.7	(0.6)	1.9	(0.3)
Republic of Ireland*	7.3	(0.6)	13.6	(0.7)	24.5	(1.1)	28.6	(1.2)	19.4	(0.9)	5.8	(0.6)	0.9	(0.2)
*Romania**	19.5	(1.4)	27.5	(1.1)	28.6	(1.4)	17.3	(1.0)	5.9	(0.8)	1.2	(0.3)	0.1	(0.1)
Russian Federation	9.5	(0.9)	19.0	(1.2)	28.5	(1.0)	25.0	(1.0)	12.7	(0.9)	4.3	(0.6)	1.0	(0.3)
Scotland	6.2	(0.7)	13.5	(1.0)	23.5	(1.1)	25.5	(1.4)	18.9	(1.1)	9.1	(0.7)	3.2	(0.5)
Serbia	17.6	(1.0)	22.9	(0.8)	26.5	(1.1)	19.9	(1.0)	9.5	(0.6)	2.9	(0.4)	0.6	(0.2)
Shanghai-China	1.4	(0.3)	3.4	(0.4)	8.7	(0.6)	15.2	(0.8)	20.8	(0.8)	23.8	(0.8)	26.6	(1.2)
Singapore	3.0	(0.3)	6.8	(0.6)	13.1	(0.6)	18.7	(0.8)	22.8	(0.6)	20.0	(0.9)	15.6	(0.6)
Slovak Republic*	7.0	(0.7)	14.0	(0.8)	23.2	(1.1)	25.0	(1.5)	18.1	(1.2)	9.1	(0.7)	3.6	(0.6)
Slovenia*	6.5	(0.4)	13.8	(0.6)	22.5	(0.7)	23.9	(0.7)	19.0	(0.8)	10.3	(0.6)	3.9	(0.4)
Spain*	9.1	(0.5)	14.6	(0.6)	23.9	(0.6)	26.6	(0.6)	17.7	(0.6)	6.7	(0.4)	1.3	(0.2)
Sweden*	7.5	(0.6)	13.6	(0.7)	23.4	(0.8)	25.2	(0.8)	19.0	(0.9)	8.9	(0.6)	2.5	(0.3)
Switzerland	4.5	(0.4)	9.0	(0.6)	15.9	(0.6)	23.0	(0.9)	23.5	(0.8)	16.3	(0.8)	7.8	(0.7)
Turkey	17.7	(1.3)	24.5	(1.1)	25.2	(1.2)	17.4	(1.1)	9.6	(0.9)	4.4	(0.9)	1.3	(0.5)
United Kingdom*	6.2	(0.5)	14.0	(0.7)	24.9	(0.9)	27.2	(1.1)	17.9	(1.0)	8.1	(0.6)	1.8	(0.3)
United States	8.1	(0.7)	15.3	(1.0)	24.4	(1.0)	25.2	(1.0)	17.1	(0.9)	8.0	(0.8)	1.9	(0.5)
Wales	8.4	(0.8)	17.9	(1.1)	28.4	(1.0)	26.1	(1.1)	14.3	(0.9)	4.4	(0.5)	0.6	(0.2)
OECD average	8.0	(0.1)	14.0	(0.1)	22.0	(0.2)	24.3	(0.2)	18.9	(0.2)	9.6	(0.1)	3.1	(0.1)

16 countries with scores below 430 omitted

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

Appendix C

C1 Significant differences in mean scores on the science scale

	Mean score		significance
	Mean	S.E.	
Shanghai-China	575	2.3	▲
Finland*	554	2.3	▲
Hong Kong-China	549	2.8	▲
Singapore	542	1.4	▲
Japan	539	3.4	▲
Korea	538	3.4	▲
New Zealand	532	2.6	▲
Canada	529	1.6	▲
*Estonia**	528	2.7	▲
Australia	527	2.5	▲
Netherlands*	522	5.4	▲
Chinese Taipei	520	2.6	▲
Germany*	520	2.8	▲
Liechtenstein	520	3.4	▲
Switzerland	517	2.8	▲
United Kingdom*	514	2.5	
Slovenia*	512	1.1	▲
Macao-China	511	1.0	▲
Poland*	508	2.4	▲
Republic of Ireland*	508	3.3	▲
Belgium*	507	2.5	▲
Hungary*	503	3.1	*NS*
United States	502	3.6	*NS*
OECD average	501	0.5	*NS*
Czech Republic*	500	3.0	*NS*
Norway	500	2.6	*NS*
Denmark*	499	2.5	*NS*
France*	498	3.6	*NS*
Wales	496	3.5	
Iceland	496	1.4	*NS*
Sweden*	495	2.7	*NS*
Austria*	494	3.2	*NS*
*Latvia**	494	3.1	*NS*
Portugal*	493	2.9	*NS*
*Lithuania**	491	2.9	*NS*
Slovak Republic*	490	3.0	*NS*
Italy*	489	1.8	*NS*
Spain*	488	2.1	*NS*
Croatia	486	2.8	▼
Luxembourg*	484	1.2	▼
Russian Federation	478	3.3	▼
Greece*	470	4.0	▼
Dubai (UAE)	466	1.2	▼
Israel	455	3.1	▼
Turkey	454	3.6	▼
Chile	447	2.9	▼
Serbia	443	2.4	▼
*Bulgaria**	439	5.9	▼
*Romania**	428	3.4	▼
Mexico	416	1.8	▼

17 countries with scores below 430 omitted

Simple comparison P-value = 5%

key

▲ significantly higher

NS no significant difference

▼ significantly lower

OECD countries (not italicised)

Countries not in OECD (italicised)

*EU countries

C2 Mean score, variation and gender differences in student performance on the science scale

	All students				Gender differences						Percentiles												difference between 5th & 95th percentile
	Mean score		Standard deviation		Boys		Girls		Difference		5th		10th		25th		75th		90th		95th		
	Mean	S.E.	S.D.	S.E.	Mean score	S.E.	Mean score	S.E.	Score dif.	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	
Australia	527	(2.5)	101	(1.6)	527	(3.1)	528	(2.8)	-1	(3.2)	355	(4.0)	395	(4.0)	461	(2.8)	597	(2.8)	655	(3.9)	688	(5.0)	333
Austria*	494	(3.2)	102	(2.2)	498	(4.2)	490	(4.4)	8	(5.7)	321	(6.8)	358	(6.2)	424	(4.8)	569	(3.6)	623	(3.3)	653	(3.4)	332
Belgium*	507	(2.5)	105	(2.3)	510	(3.6)	503	(3.2)	6	(4.5)	321	(6.2)	364	(4.8)	438	(3.6)	583	(2.8)	634	(3.1)	661	(3.2)	340
*Bulgaria**	439	(5.9)	106	(2.5)	430	(6.8)	450	(5.3)	**-20**	(4.4)	263	(7.6)	302	(7.0)	367	(7.6)	514	(6.8)	575	(5.7)	607	(7.1)	344
Canada	529	(1.6)	90	(0.9)	531	(1.9)	526	(1.9)	**5**	(1.9)	377	(2.8)	412	(2.7)	469	(2.0)	593	(1.7)	642	(1.7)	669	(2.6)	292
Chile	447	(2.9)	81	(1.5)	452	(3.5)	443	(3.5)	**9**	(3.8)	315	(4.3)	343	(4.1)	392	(3.5)	502	(3.6)	553	(3.8)	583	(5.0)	268
Chinese Taipei	520	(2.6)	87	(1.6)	520	(3.7)	521	(4.0)	-1	(5.6)	370	(4.4)	404	(3.6)	464	(3.1)	581	(3.3)	628	(4.3)	654	(4.4)	284
Croatia	486	(2.8)	85	(1.8)	482	(3.5)	491	(3.9)	-9	(4.7)	348	(4.7)	377	(4.0)	429	(3.7)	546	(3.5)	595	(4.0)	624	(5.0)	276
Czech Republic*	500	(3.0)	97	(1.9)	498	(4.0)	503	(3.2)	-5	(4.2)	338	(6.5)	375	(5.6)	437	(3.9)	568	(3.4)	624	(4.0)	657	(4.4)	318
Denmark*	499	(2.5)	92	(1.3)	505	(3.0)	494	(2.9)	**12**	(3.2)	343	(4.1)	379	(3.9)	438	(3.1)	564	(2.9)	615	(3.7)	645	(3.8)	302
Dubai (UAE)	466	(1.2)	106	(1.1)	453	(1.8)	480	(1.6)	**-27**	(2.4)	294	(2.5)	330	(2.5)	391	(1.6)	542	(1.9)	606	(3.0)	638	(3.3)	344
England	515	(3.0)	99	(1.6)	520	(4.3)	510	(3.7)	10	(5.4)	349	(5.1)	385	(4.5)	448	(4.4)	584	(3.8)	641	(3.8)	673	(4.5)	325
*Estonia**	528	(2.7)	84	(1.6)	527	(3.1)	528	(3.1)	-1	(3.2)	388	(5.0)	419	(4.7)	472	(3.8)	586	(3.1)	635	(3.5)	665	(4.3)	277
Finland*	554	(2.3)	89	(1.1)	546	(2.7)	562	(2.6)	**-15**	(2.6)	400	(4.2)	437	(4.2)	496	(3.3)	617	(2.9)	665	(3.0)	694	(3.6)	294
France*	498	(3.6)	103	(2.8)	500	(4.6)	497	(3.5)	3	(3.9)	314	(8.1)	358	(7.1)	433	(5.6)	572	(3.8)	624	(4.2)	653	(4.6)	339
Germany*	520	(2.8)	101	(1.9)	523	(3.7)	518	(3.3)	6	(4.2)	345	(7.0)	383	(6.2)	452	(4.1)	594	(3.3)	645	(3.5)	675	(3.8)	330
Greece*	470	(4.0)	92	(2.1)	465	(5.1)	475	(3.7)	**-10**	(3.8)	318	(7.6)	353	(6.3)	409	(5.3)	535	(3.8)	586	(3.6)	616	(3.4)	298
Hong Kong-China	549	(2.8)	87	(2.0)	550	(3.8)	548	(3.4)	3	(4.7)	393	(7.3)	432	(4.9)	494	(3.9)	610	(2.9)	655	(2.9)	681	(3.3)	287
Hungary*	503	(3.1)	86	(2.9)	503	(3.8)	503	(3.5)	0	(3.8)	348	(11.4)	388	(7.6)	446	(4.6)	564	(3.7)	609	(3.6)	636	(4.4)	288
Iceland	496	(1.4)	95	(1.2)	496	(2.1)	495	(2.0)	2	(2.9)	330	(4.3)	370	(4.3)	435	(2.6)	561	(2.2)	616	(2.8)	647	(4.4)	317
Israel	455	(3.1)	107	(2.4)	453	(4.4)	456	(3.2)	-3	(4.4)	275	(8.1)	314	(5.5)	382	(4.5)	531	(3.3)	590	(4.0)	623	(4.2)	348
Italy*	489	(1.8)	97	(1.5)	488	(2.5)	490	(2.0)	-2	(2.9)	325	(3.8)	362	(2.6)	424	(2.3)	557	(2.0)	609	(2.0)	639	(2.3)	314
Japan	539	(3.4)	100	(2.5)	534	(5.5)	545	(3.9)	-12	(6.7)	361	(8.7)	405	(7.3)	477	(4.8)	610	(3.2)	659	(3.5)	686	(4.1)	325
Korea	538	(3.4)	82	(2.3)	537	(5.0)	539	(4.2)	-2	(6.3)	399	(6.5)	431	(5.2)	485	(4.2)	595	(3.7)	640	(3.7)	665	(4.8)	266
*Latvia**	494	(3.1)	78	(1.7)	490	(3.7)	497	(3.2)	**-7**	(3.4)	365	(5.7)	392	(4.5)	440	(4.1)	548	(3.2)	593	(4.0)	619	(3.3)	254
Liechtenstein	520	(3.4)	87	(3.4)	527	(5.0)	511	(5.1)	**16**	(7.5)	373	(10.5)	402	(9.3)	457	(7.4)	583	(6.2)	631	(9.3)	659	(7.3)	286
*Lithuania**	491	(2.9)	85	(2.1)	483	(3.5)	500	(2.9)	**-17**	(2.9)	351	(6.1)	382	(4.9)	434	(3.7)	549	(3.2)	600	(3.9)	630	(3.7)	280
Luxembourg*	484	(1.2)	104	(1.1)	487	(2.0)	480	(1.6)	**7**	(2.6)	304	(4.6)	345	(3.2)	415	(3.1)	558	(2.3)	615	(2.1)	646	(4.0)	342
Macao-China	511	(1.0)	76	(0.8)	510	(1.3)	512	(1.2)	-2	(1.5)	381	(2.5)	411	(1.9)	461	(2.0)	564	(1.7)	608	(2.5)	632	(3.2)	251
Mexico	416	(1.8)	77	(0.9)	419	(2.0)	413	(1.9)	**6**	(1.6)	291	(2.8)	318	(2.1)	364	(1.7)	468	(2.1)	517	(2.8)	544	(2.8)	254
Netherlands*	522	(5.4)	96	(2.1)	524	(5.3)	520	(5.9)	4	(3.0)	362	(6.8)	395	(7.0)	453	(7.6)	594	(5.1)	645	(4.8)	673	(4.9)	311
New Zealand	532	(2.6)	107	(2.0)	529	(4.0)	535	(2.9)	-6	(4.6)	348	(5.6)	390	(4.3)	461	(4.1)	608	(3.0)	667	(3.3)	697	(3.6)	349
Northern Ireland	511	(4.4)	103	(3.9)	514	(8.7)	509	(4.5)	5	(10.4)	341	(12.1)	378	(9.0)	440	(7.3)	584	(5.0)	642	(5.8)	676	(5.7)	335
Norway	500	(2.6)	90	(1.0)	498	(3.0)	502	(2.8)	-4	(2.8)	346	(4.4)	382	(3.3)	440	(3.0)	563	(2.9)	615	(3.7)	644	(4.0)	298
Poland*	508	(2.4)	87	(1.2)	505	(2.7)	511	(2.8)	**-6**	(2.7)	364	(3.9)	396	(3.3)	448	(2.7)	569	(2.7)	621	(2.9)	650	(3.8)	286
Portugal*	493	(2.9)	83	(1.4)	491	(3.4)	495	(3.0)	-3	(2.8)	354	(4.0)	384	(3.7)	436	(3.7)	551	(3.0)	601	(3.3)	627	(3.8)	273
Republic of Ireland*	508	(3.3)	97	(2.1)	507	(4.3)	509	(3.8)	-3	(4.8)	341	(8.3)	382	(4.9)	445	(3.7)	576	(3.3)	627	(4.0)	656	(4.4)	315
*Romania**	428	(3.4)	79	(1.9)	423	(3.9)	433	(3.7)	**-10**	(3.9)	301	(5.0)	327	(4.2)	373	(4.4)	483	(4.0)	530	(4.2)	558	(4.2)	257
Russian Federation	478	(3.3)	90	(2.0)	477	(3.7)	480	(3.5)	-3	(2.9)	331	(5.8)	364	(4.7)	418	(4.0)	539	(3.5)	594	(4.6)	628	(5.2)	297
Scotland	514	(3.5)	96	(1.4)	519	(4.4)	510	(4.0)	9	(4.7)	358	(6.0)	391	(4.4)	449	(4.1)	582	(4.4)	638	(4.6)	669	(5.6)	312
Serbia	443	(2.4)	84	(1.6)	442	(3.1)	443	(2.8)	-1	(3.5)	302	(5.0)	334	(4.4)	387	(3.1)	501	(3.0)	548	(3.3)	579	(3.2)	277
Shanghai-China	575	(2.3)	82	(1.7)	574	(3.1)	575	(2.3)	-1	(2.9)	430	(4.9)	467	(4.4)	523	(2.9)	632	(2.8)	674	(3.4)	700	(3.3)	270
Singapore	542	(1.4)	104	(1.1)	541	(1.8)	542	(1.8)	-1	(2.4)	362	(3.5)	401	(3.1)	471	(2.0)	617	(2.0)	673	(3.0)	704	(4.1)	342
Slovak Republic*	490	(3.0)	95	(2.6)	490	(4.0)	491	(3.2)	-1	(4.1)	335	(6.0)	371	(4.9)	427	(3.9)	556	(3.4)	612	(4.1)	643	(4.6)	308
Slovenia*	512	(1.1)	94	(1.0)	505	(1.7)	519	(1.6)	**-14**	(2.5)	355	(2.9)	387	(2.3)	446	(2.0)	580	(2.4)	633	(3.0)	661	(4.3)	306
Spain*	488	(2.1)	87	(1.1)	492	(2.5)	485	(2.3)	**7**	(2.3)	338	(3.5)	373	(3.2)	431	(3.0)	549	(2.2)	597	(2.2)	625	(2.3)	286
Sweden*	495	(2.7)	100	(1.5)	493	(3.0)	497	(3.2)	-4	(3.0)	327	(4.7)	367	(4.6)	429	(3.8)	564	(3.4)	622	(3.9)	654	(4.8)	327
Switzerland	517	(2.8)	96	(1.4)	520	(3.2)	512	(3.0)	**8**	(2.7)	352	(4.2)	388	(3.6)	452	(3.5)	585	(3.4)	637	(3.8)	667	(4.3)	314
Turkey	454	(3.6)	81	(2.0)	448	(3.8)	460	(4.5)	**-12**	(4.1)	322	(5.0)	350	(4.2)	397	(3.3)	510	(4.6)	560	(5.8)	587	(6.4)	265
United Kingdom*	514	(2.5)	99	(1.4)	519	(3.6)	509	(3.2)	**9**	(4.5)	348	(4.3)	385	(3.6)	447	(3.7)	583	(3.1)	640	(3.3)	672	(3.9)	324
United States	502	(3.6)	98	(1.7)	509	(4.2)	495	(3.7)	**14**	(3.3)	341	(4.8)	374	(4.5)	433	(3.9)	572	(4.7)	629	(5.1)	662	(6.7)	321
Wales	496	(3.5)	95	(1.4)	500	(4.0)	491	(4.0)	**9**	(3.7)	336	(5.8)	373	(5.2)	430	(4.5)	561	(3.8)	619	(3.8)	655	(5.2)	318
OECD average	501	(0.5)	94	(0.3)	501	(0.6)	501	(0.6)	0	(0.6)	341	(1.0)	377	(0.8)	438	(0.7)	567	(0.6)	619	(0.6)	649	(0.7)	308

17 countries with scores below 430 omitted

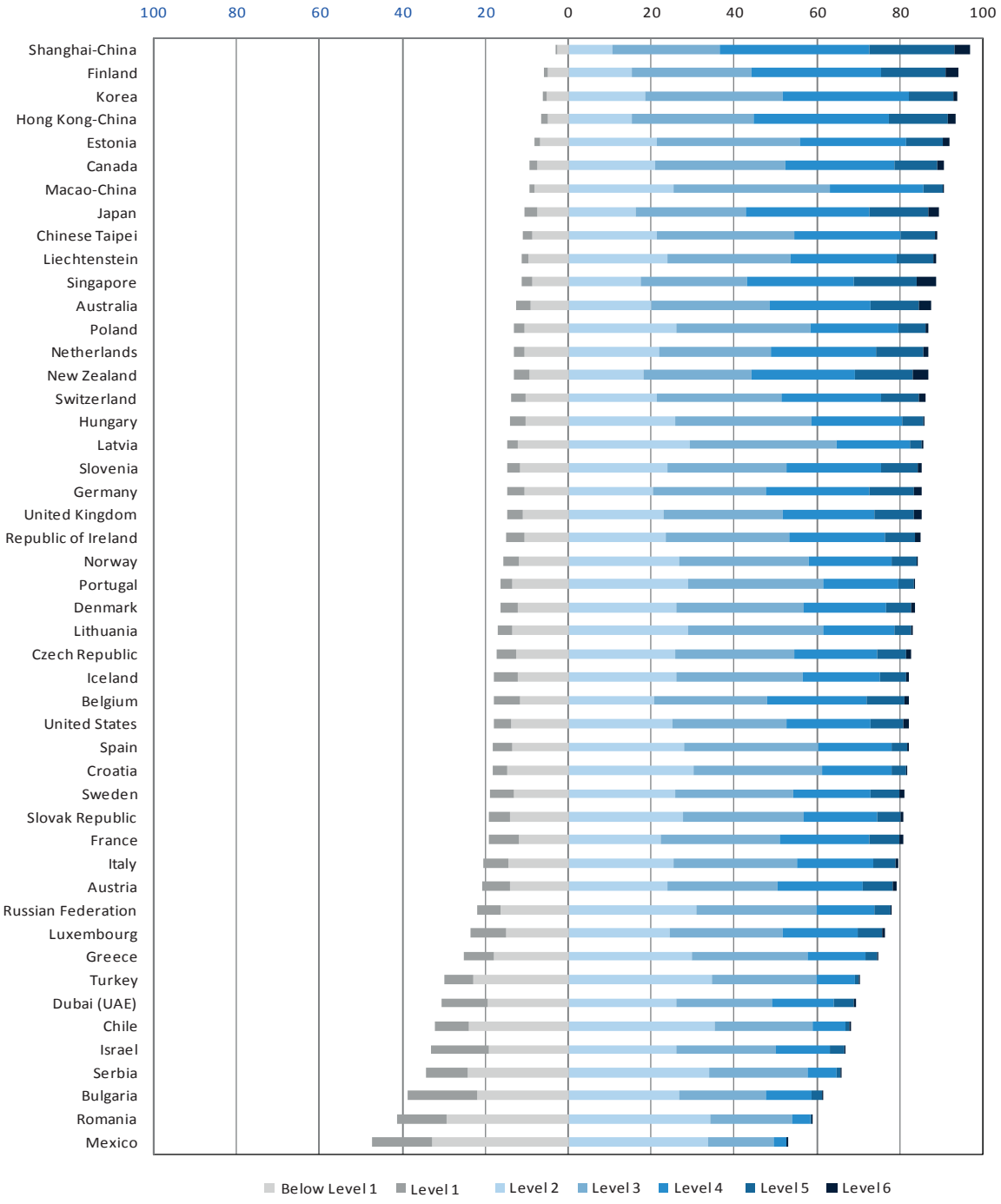
Note: Values that are statistically significant are indicated in bold

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

C3 Summary descriptions for the six levels of proficiency in science

Level	What students can typically do
6	At Level 6, students can consistently identify, explain and apply scientific knowledge and *knowledge about science* in a variety of complex life situations. They can link different information sources and explanations and use evidence from those sources to justify decisions. They clearly and consistently demonstrate advanced scientific thinking and reasoning, and they demonstrate willingness to use their scientific understanding in support of solutions to unfamiliar scientific and technological situations. Students at this level can use scientific knowledge and develop arguments in support of recommendations and decisions that centre on personal, social or global situations.
5	At Level 5, students can identify the scientific components of many complex life situations, apply both scientific concepts and *knowledge about science* to these situations, and can compare, select and evaluate appropriate scientific evidence for responding to life situations. Students at this level can use well-developed inquiry abilities, link knowledge appropriately and bring critical insights to situations. They can construct explanations based on evidence and arguments based on their critical analysis.
4	At Level 4, students can work effectively with situations and issues that may involve explicit phenomena requiring them to make inferences about the role of science or technology. They can select and integrate explanations from different disciplines of science or technology and link those explanations directly to aspects of life situations. Students at this level can reflect on their actions and they can communicate decisions using scientific knowledge and evidence.
3	At Level 3, students can identify clearly described scientific issues in a range of contexts. They can select facts and knowledge to explain phenomena and apply simple models or inquiry strategies. Students at this level can interpret and use scientific concepts from different disciplines and can apply them directly. They can develop short statements using facts and make decisions based on scientific knowledge.
2	At Level 2, students have adequate scientific knowledge to provide possible explanations in familiar contexts or draw conclusions based on simple investigations. They are capable of direct reasoning and making literal interpretations of the results of scientific inquiry or technological problem solving.
1	At Level 1, students have such a limited scientific knowledge that it can only be applied to a few, familiar situations. They can present scientific explanations that are obvious and follow explicitly from given evidence.

C4 Summary of percentage of students at each level of proficiency on the science scale



Note : Countries are ranked in descending order of the percentage of students at Levels 2, 3, 4, 5 and 6.
Source : OECD PISA 2009 database, Table I.3.4.

17 countries with scores below 430 omitted

C5 Percentage of students at each proficiency level on the science scale

	Proficiency levels													
	Below Level 1		Level 1		Level 2		Level 3		Level 4		Level 5		Level 6	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
Australia	3.4	(0.3)	9.2	(0.5)	20.0	(0.6)	28.4	(0.7)	24.5	(0.7)	11.5	(0.6)	3.1	(0.5)
Austria*	6.7	(0.8)	14.3	(1.0)	23.8	(1.0)	26.6	(1.0)	20.6	(1.0)	7.1	(0.6)	1.0	(0.2)
Belgium*	6.4	(0.6)	11.7	(0.6)	20.7	(0.6)	27.2	(0.8)	24.0	(0.8)	9.0	(0.6)	1.1	(0.2)
*Bulgaria**	16.5	(1.6)	22.3	(1.5)	26.6	(1.3)	21.0	(1.4)	10.9	(1.0)	2.4	(0.5)	0.2	(0.1)
Canada	2.0	(0.2)	7.5	(0.4)	20.9	(0.5)	31.2	(0.6)	26.2	(0.6)	10.5	(0.4)	1.6	(0.2)
Chile	8.4	(0.8)	23.9	(1.1)	35.2	(0.9)	23.6	(1.1)	7.9	(0.7)	1.1	(0.2)	0.0	(0.0)
Chinese Taipei	2.2	(0.3)	8.9	(0.6)	21.1	(0.9)	33.3	(1.0)	25.8	(1.1)	8.0	(0.7)	0.8	(0.2)
Croatia	3.6	(0.5)	14.9	(1.0)	30.0	(1.1)	31.1	(1.0)	16.7	(1.0)	3.5	(0.6)	0.2	(0.1)
Czech Republic*	4.7	(0.6)	12.6	(0.9)	25.6	(1.0)	28.8	(1.2)	19.9	(0.9)	7.2	(0.6)	1.2	(0.2)
Denmark*	4.1	(0.4)	12.5	(0.7)	26.0	(0.8)	30.6	(1.1)	20.1	(0.8)	5.9	(0.5)	0.9	(0.2)
Dubai (UAE)	11.0	(0.5)	19.5	(0.6)	26.0	(0.8)	22.9	(0.7)	14.9	(0.6)	4.8	(0.3)	0.8	(0.2)
England	3.8	(0.4)	11.0	(0.8)	22.3	(0.9)	28.8	(1.2)	22.5	(1.0)	9.7	(0.7)	1.9	(0.3)
*Estonia**	1.3	(0.3)	7.0	(0.7)	21.3	(1.1)	34.3	(1.1)	25.7	(1.1)	9.0	(0.6)	1.4	(0.3)
Finland*	1.1	(0.2)	4.9	(0.4)	15.3	(0.7)	28.8	(0.9)	31.2	(1.1)	15.4	(0.7)	3.3	(0.3)
France*	7.1	(0.8)	12.2	(0.8)	22.1	(1.2)	28.8	(1.3)	21.7	(1.0)	7.3	(0.7)	0.8	(0.2)
Germany*	4.1	(0.5)	10.7	(0.8)	20.1	(0.9)	27.3	(1.1)	25.0	(1.2)	10.9	(0.7)	1.9	(0.3)
Greece*	7.2	(1.1)	18.1	(1.0)	29.8	(1.0)	27.9	(1.2)	14.0	(1.0)	2.8	(0.3)	0.3	(0.1)
Hong Kong-China	1.4	(0.3)	5.2	(0.6)	15.1	(0.7)	29.4	(1.0)	32.7	(1.0)	14.2	(0.9)	2.0	(0.3)
Hungary*	3.8	(0.9)	10.4	(0.9)	25.5	(1.1)	33.2	(1.3)	21.8	(1.2)	5.1	(0.5)	0.3	(0.1)
Iceland	5.5	(0.5)	12.5	(0.6)	25.8	(0.8)	30.4	(0.9)	18.8	(0.8)	6.1	(0.4)	0.8	(0.2)
Israel	13.9	(1.1)	19.2	(0.7)	26.0	(1.0)	24.1	(0.8)	12.8	(0.7)	3.5	(0.4)	0.5	(0.1)
Italy*	6.1	(0.4)	14.5	(0.5)	25.5	(0.6)	29.5	(0.5)	18.6	(0.5)	5.3	(0.3)	0.5	(0.1)
Japan	3.2	(0.5)	7.5	(0.7)	16.3	(0.9)	26.6	(0.8)	29.5	(1.0)	14.4	(0.7)	2.6	(0.4)
Korea	1.1	(0.3)	5.2	(0.7)	18.5	(1.2)	33.1	(1.1)	30.4	(1.1)	10.5	(0.9)	1.1	(0.3)
*Latvia**	2.3	(0.6)	12.5	(1.0)	29.1	(1.1)	35.5	(1.2)	17.6	(1.1)	3.0	(0.5)	0.1	(0.1)
Liechtenstein	1.4	(0.7)	9.9	(1.9)	23.8	(3.1)	29.8	(3.7)	25.4	(2.7)	9.0	(1.7)	0.7	(0.7)
*Lithuania**	3.5	(0.6)	13.5	(0.8)	28.9	(1.0)	32.4	(1.2)	17.0	(0.8)	4.3	(0.4)	0.4	(0.1)
Luxembourg*	8.4	(0.5)	15.3	(0.9)	24.3	(0.7)	27.1	(0.9)	18.2	(0.9)	6.0	(0.5)	0.7	(0.1)
Macao-China	1.5	(0.2)	8.1	(0.4)	25.2	(0.8)	37.8	(0.7)	22.7	(1.0)	4.5	(0.5)	0.2	(0.1)
Mexico	14.5	(0.6)	32.8	(0.6)	33.6	(0.6)	15.8	(0.6)	3.1	(0.3)	0.2	(0.0)	0.0	(0.0)
Netherlands*	2.6	(0.5)	10.6	(1.3)	21.8	(1.5)	26.9	(1.1)	25.3	(1.7)	11.2	(1.1)	1.5	(0.3)
New Zealand	4.0	(0.5)	9.4	(0.5)	18.1	(1.0)	25.8	(0.9)	25.1	(0.7)	14.0	(0.7)	3.6	(0.4)
Northern Ireland	4.4	(1.2)	12.3	(0.9)	21.8	(1.3)	28.2	(1.5)	21.6	(1.1)	9.7	(1.1)	2.1	(0.4)
Norway	3.8	(0.5)	11.9	(0.9)	26.6	(0.9)	31.1	(0.7)	20.1	(0.8)	5.9	(0.6)	0.5	(0.2)
Poland*	2.3	(0.3)	10.9	(0.7)	26.1	(0.8)	32.1	(0.8)	21.2	(1.0)	6.8	(0.5)	0.8	(0.2)
Portugal*	3.0	(0.4)	13.5	(0.9)	28.9	(1.1)	32.3	(1.1)	18.1	(1.0)	3.9	(0.5)	0.3	(0.1)
Republic of Ireland*	4.4	(0.7)	10.7	(1.0)	23.3	(1.2)	29.9	(1.0)	22.9	(0.9)	7.5	(0.7)	1.2	(0.2)
*Romania**	11.9	(1.1)	29.5	(1.6)	34.1	(1.7)	19.7	(1.2)	4.4	(0.6)	0.4	(0.1)	0.0	(0.0)
Russian Federation	5.5	(0.7)	16.5	(1.1)	30.7	(1.1)	29.0	(1.2)	13.9	(0.9)	3.9	(0.5)	0.4	(0.2)
Scotland	3.1	(0.4)	11.0	(0.8)	24.0	(1.2)	28.9	(1.0)	22.0	(1.1)	9.3	(0.9)	1.7	(0.3)
Serbia	10.1	(0.8)	24.3	(1.0)	33.9	(1.2)	23.6	(0.7)	7.1	(0.6)	1.0	(0.2)	0.0	(0.0)
Shanghai-China	0.4	(0.1)	2.8	(0.4)	10.5	(0.7)	26.0	(1.0)	36.1	(1.1)	20.4	(1.0)	3.9	(0.5)
Singapore	2.8	(0.2)	8.7	(0.5)	17.5	(0.6)	25.4	(0.8)	25.7	(0.7)	15.3	(0.7)	4.6	(0.5)
Slovak Republic*	5.0	(0.6)	14.2	(0.9)	27.6	(1.0)	29.2	(0.9)	17.7	(0.9)	5.6	(0.5)	0.7	(0.2)
Slovenia*	3.1	(0.2)	11.7	(0.5)	23.7	(0.7)	28.7	(1.1)	23.0	(0.7)	8.7	(0.6)	1.2	(0.3)
Spain*	4.6	(0.4)	13.6	(0.7)	27.9	(0.7)	32.3	(0.7)	17.6	(0.6)	3.7	(0.3)	0.2	(0.1)
Sweden*	5.8	(0.5)	13.4	(0.8)	25.6	(0.8)	28.4	(0.8)	18.7	(0.9)	7.1	(0.6)	1.0	(0.2)
Switzerland	3.5	(0.3)	10.6	(0.6)	21.3	(1.1)	29.8	(1.0)	24.1	(1.0)	9.2	(0.7)	1.5	(0.2)
Turkey	6.9	(0.8)	23.0	(1.1)	34.5	(1.2)	25.2	(1.2)	9.1	(1.1)	1.1	(0.3)	0.0	(0.0)
United Kingdom*	3.8	(0.3)	11.2	(0.7)	22.7	(0.7)	28.8	(1.0)	22.2	(0.8)	9.5	(0.6)	1.9	(0.2)
United States	4.2	(0.5)	13.9	(0.9)	25.0	(0.9)	27.5	(0.8)	20.1	(0.9)	7.9	(0.8)	1.3	(0.3)
Wales	4.8	(0.6)	13.9	(1.1)	26.3	(1.2)	29.2	(1.1)	18.1	(0.9)	6.8	(0.6)	1.0	(0.2)
OECD average	5.0	(0.1)	13.0	(0.1)	24.4	(0.2)	28.6	(0.2)	20.6	(0.2)	7.4	(0.1)	1.1	(0.0)

17 countries with scores below 430 omitted

OECD countries (not italicised) *Countries not in OECD (italicised)* *EU countries

D1 PISA index of economic, social and cultural status and performance in reading, by national quarters of the index (OECD countries)

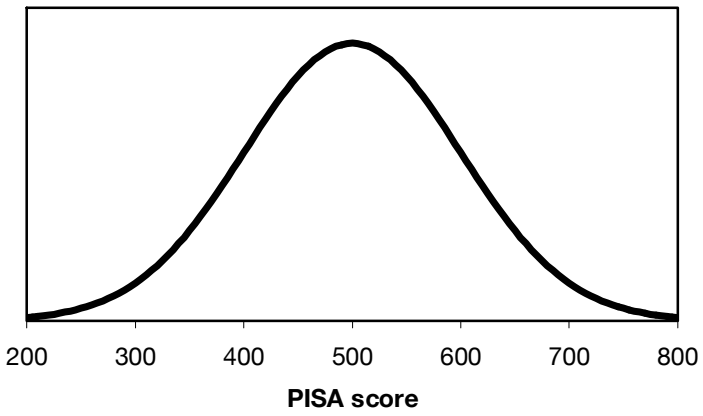
	PISA index of economic, social and cultural status										Performance on the reading scale, by national quarters of this index								Change in the reading score per unit of this index		Increased likelihood of students in the bottom quarter of the PISA index of social, economic and cultural status, scoring in the bottom quarter of the national reading performance distribution		Explained variance in student performance (r-squared x 100)	
	All students		Bottom quarter		Second quarter		Third quarter		Top quarter		Bottom quarter		Second quarter		Third quarter		Top quarter							
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Effect	S.E.	Ratio	S.E.	Percentage	S.E.
Iceland	0.72	(0.01)	-0.46	(0.02)	0.45	(0.01)	1.10	(0.01)	1.79	(0.01)	470	(3.1)	494	(3.3)	513	(3.0)	530	(2.8)	27	(1.79)	**1.68**	(0.10)	6.2	(0.8)
Canada	0.50	(0.02)	-0.59	(0.01)	0.25	(0.00)	0.83	(0.00)	1.52	(0.01)	495	(2.3)	514	(1.7)	533	(2.1)	562	(2.4)	32	(1.44)	**1.72**	(0.08)	8.6	(0.7)
Norway	0.47	(0.02)	-0.47	(0.01)	0.23	(0.00)	0.73	(0.00)	1.40	(0.01)	468	(3.4)	495	(3.3)	517	(2.9)	536	(3.9)	36	(2.14)	**1.96**	(0.11)	8.6	(1.0)
Finland*	0.37	(0.02)	-0.64	(0.01)	0.12	(0.00)	0.69	(0.00)	1.32	(0.01)	504	(3.2)	527	(2.7)	548	(2.9)	565	(2.8)	31	(1.66)	**1.83**	(0.10)	7.8	(0.8)
Australia	0.34	(0.01)	-0.63	(0.01)	0.09	(0.00)	0.63	(0.00)	1.29	(0.01)	471	(2.7)	504	(2.4)	532	(3.0)	562	(3.1)	46	(1.77)	**2.14**	(0.08)	12.7	(0.8)
Sweden*	0.33	(0.02)	-0.72	(0.02)	0.08	(0.00)	0.63	(0.01)	1.33	(0.01)	452	(4.0)	488	(3.3)	515	(3.3)	543	(4.1)	43	(2.17)	**2.16**	(0.13)	13.4	(1.3)
Denmark*	0.30	(0.02)	-0.83	(0.01)	0.00	(0.01)	0.62	(0.01)	1.39	(0.01)	455	(2.7)	486	(3.4)	509	(2.9)	536	(2.4)	36	(1.42)	**2.11**	(0.14)	14.5	(1.0)
Netherlands*	0.27	(0.03)	-0.84	(0.03)	0.01	(0.01)	0.61	(0.01)	1.31	(0.01)	474	(5.5)	493	(5.8)	519	(4.7)	553	(5.9)	37	(1.90)	**1.79**	(0.12)	12.8	(1.2)
England	0.21	(0.02)	-0.79	(0.02)	-0.05	(0.01)	0.48	(0.01)	1.21	(0.01)	451	(3.4)	483	(3.7)	510	(3.4)	544	(3.8)	44	(2.2)	**2.13**	(0.13)	13.8	(1.2)
United Kingdom*	0.20	(0.02)	-0.80	(0.02)	-0.06	(0.00)	0.47	(0.01)	1.21	(0.01)	451	(2.9)	483	(3.1)	508	(2.7)	544	(3.2)	44	(1.86)	**2.12**	(0.11)	13.7	(1.0)
Belgium*	0.20	(0.02)	-1.00	(0.02)	-0.13	(0.00)	0.54	(0.00)	1.37	(0.01)	452	(3.3)	489	(3.3)	525	(2.5)	567	(2.6)	47	(1.48)	**2.45**	(0.12)	19.3	(1.0)
Scotland	0.19	(0.03)	-0.84	(0.01)	-0.11	(0.01)	0.46	(0.01)	1.24	(0.02)	458	(3.9)	487	(3.7)	513	(3.9)	549	(4.4)	44	(2.3)	**2.04**	(0.13)	14.4	(1.5)
Luxembourg*	0.19	(0.01)	-1.31	(0.02)	-0.09	(0.01)	0.64	(0.01)	1.51	(0.01)	411	(2.7)	460	(3.0)	497	(2.8)	526	(3.0)	40	(1.31)	**2.60**	(0.17)	18.0	(1.1)
Germany*	0.18	(0.02)	-0.93	(0.02)	-0.12	(0.00)	0.42	(0.01)	1.36	(0.01)	445	(3.9)	494	(2.9)	515	(3.5)	550	(3.3)	44	(1.92)	**2.60**	(0.15)	17.9	(1.3)
United States	0.17	(0.04)	-1.05	(0.02)	-0.11	(0.01)	0.52	(0.01)	1.32	(0.02)	451	(3.6)	481	(3.6)	512	(3.6)	558	(4.7)	42	(2.27)	**2.17**	(0.14)	16.8	(1.7)
Wales	0.16	(0.03)	-0.78	(0.01)	-0.11	(0.01)	0.39	(0.01)	1.13	(0.02)	443	(4.2)	466	(4.5)	483	(4.3)	520	(5.1)	39	(2.7)	**1.86**	(0.16)	10.2	(1.4)
Northern Ireland	0.12	(0.02)	-0.87	(0.02)	-0.17	(0.01)	0.38	(0.01)	1.13	(0.01)	452	(7.3)	486	(4.3)	520	(5.2)	548	(5.2)	48	(3.5)	**2.32**	(0.24)	15.2	(2.0)
New Zealand	0.09	(0.02)	-0.93	(0.01)	-0.17	(0.00)	0.36	(0.01)	1.08	(0.01)	475	(3.9)	508	(3.1)	534	(3.3)	578	(3.6)	52	(1.94)	**2.23**	(0.12)	16.6	(1.1)
Switzerland	0.08	(0.02)	-1.04	(0.01)	-0.22	(0.00)	0.35	(0.00)	1.22	(0.01)	457	(3.9)	492	(2.7)	506	(3.0)	550	(3.7)	40	(2.09)	**2.12**	(0.13)	14.1	(1.4)
Slovenia*	0.07	(0.01)	-1.01	(0.01)	-0.31	(0.01)	0.37	(0.01)	1.25	(0.01)	444	(2.6)	468	(2.5)	493	(2.7)	532	(2.6)	39	(1.53)	**2.03**	(0.14)	14.3	(1.1)
Austria*	0.06	(0.02)	-0.97	(0.02)	-0.22	(0.00)	0.28	(0.00)	1.15	(0.01)	421	(4.3)	457	(4.2)	482	(3.8)	525	(3.9)	48	(2.28)	**2.36**	(0.13)	16.6	(1.4)
Republic of Ireland*	0.05	(0.03)	-1.01	(0.01)	-0.27	(0.01)	0.31	(0.01)	1.15	(0.02)	454	(3.8)	486	(4.0)	511	(3.9)	539	(3.5)	39	(2.05)	**2.21**	(0.16)	12.6	(1.2)
Japan	-0.01	(0.01)	-0.93	(0.01)	-0.28	(0.00)	0.24	(0.00)	0.93	(0.01)	483	(4.8)	510	(4.8)	536	(4.0)	558	(3.5)	40	(2.83)	**1.84**	(0.10)	8.6	(1.0)
Greece*	-0.02	(0.03)	-1.28	(0.02)	-0.40	(0.01)	0.32	(0.01)	1.27	(0.01)	437	(7.1)	475	(5.2)	493	(3.7)	528	(3.4)	34	(2.42)	**2.22**	(0.15)	12.5	(1.4)
Israel	-0.02	(0.03)	-1.20	(0.02)	-0.24	(0.01)	0.33	(0.00)	1.01	(0.01)	423	(5.4)	465	(4.0)	501	(3.6)	526	(4.1)	43	(2.45)	**2.24**	(0.13)	12.5	(1.1)
Czech Republic*	-0.09	(0.01)	-0.95	(0.01)	-0.34	(0.00)	0.11	(0.00)	0.85	(0.01)	437	(3.3)	467	(3.7)	490	(3.4)	521	(4.1)	46	(2.34)	**2.00**	(0.12)	12.4	(1.1)
Slovak Republic*	-0.09	(0.02)	-1.04	(0.02)	-0.44	(0.00)	0.04	(0.01)	1.07	(0.02)	435	(5.0)	468	(3.4)	488	(3.3)	521	(3.6)	41	(2.30)	**2.10**	(0.16)	14.6	(1.5)
Italy*	-0.12	(0.01)	-1.41	(0.01)	-0.47	(0.00)	0.18	(0.00)	1.21	(0.01)	442	(3.0)	477	(2.0)	500	(2.0)	526	(2.1)	32	(1.27)	**2.09**	(0.08)	11.8	(0.7)
France*	-0.13	(0.03)	-1.19	(0.02)	-0.42	(0.00)	0.15	(0.01)	0.93	(0.02)	443	(5.2)	484	(4.6)	513	(4.4)	553	(4.8)	51	(2.94)	**2.41**	(0.17)	16.7	(2.0)
Korea	-0.15	(0.03)	-1.22	(0.01)	-0.42	(0.01)	0.14	(0.01)	0.88	(0.02)	503	(5.1)	534	(2.8)	548	(3.9)	572	(4.6)	32	(2.46)	**2.15**	(0.16)	11.0	(1.5)
Hungary*	-0.20	(0.03)	-1.38	(0.03)	-0.56	(0.00)	0.06	(0.01)	1.10	(0.02)	435	(5.3)	485	(3.4)	505	(4.1)	553	(4.1)	48	(2.17)	**3.01**	(0.23)	26.0	(2.2)
Poland*	-0.28	(0.02)	-1.29	(0.01)	-0.66	(0.00)	-0.15	(0.00)	0.97	(0.01)	461	(3.4)	488	(3.1)	507	(2.9)	550	(3.8)	39	(1.94)	**2.03**	(0.12)	14.8	(1.4)
Spain*	-0.31	(0.03)	-1.68	(0.02)	-0.74	(0.00)	0.03	(0.01)	1.14	(0.01)	443	(3.3)	468	(2.3)	491	(2.2)	525	(3.3)	29	(1.49)	**2.03**	(0.10)	13.6	(1.3)
Portugal*	-0.32	(0.04)	-1.70	(0.01)	-0.87	(0.01)	-0.05	(0.01)	1.35	(0.03)	451	(4.2)	472	(3.4)	499	(3.4)	537	(3.7)	30	(1.57)	**2.01**	(0.15)	16.5	(1.6)
Chile	-0.57	(0.04)	-2.00	(0.01)	-1.00	(0.01)	-0.22	(0.01)	0.95	(0.02)	409	(3.5)	435	(3.6)	457	(3.5)	501	(3.5)	31	(1.51)	**2.26**	(0.15)	18.7	(1.6)
Turkey	-1.16	(0.05)	-2.63	(0.02)	-1.69	(0.01)	-0.82	(0.01)	0.49	(0.03)	422	(3.8)	454	(3.5)	469	(3.9)	514	(4.6)	29	(1.53)	**2.26**	(0.19)	19.0	(1.9)
Mexico	-1.22	(0.03)	-2.83	(0.01)	-1.79	(0.00)	-0.81	(0.01)	0.54	(0.02)	386	(2.8)	413	(2.3)	434	(2.2)	469	(2.2)	25	(0.96)	**2.10**	(0.10)	14.5	(1.0)
OECD average	0.00	(0.00)	-1.14	(0.00)	-0.32	(0.00)	0.30	(0.00)	1.17	(0.00)	451	(0.7)	483	(0.6)	506	(0.6)	540	(0.6)	38	(0.34)	**2.14**	(0.02)	14.0	(0.2)

*EUcourtries

Appendix E

Notes on PISA International Scale Scores

PISA defines an international scale for each subject in such a way that, for each subject when it is first run as a major focus[1], the 'OECD population' has a Normal distribution with a mean of 500 and standard deviation of 100. This is illustrated in the 'bell-shaped' curve below.



How the OECD population is defined is rather complex:

1. The sample of pupils within each OECD country is selected;
2. Their results are weighted in such a way that each country in the study (i.e. UK as a whole, not England) has an equal weight;
3. Pupils' scores are adjusted to have the above distribution within this hypothetical population.

Thus the important unit is the country, not the student – Russia and Hong Kong have the same weights in the scale, despite differences in size.

PISA scores are thus defined on a scale which does not relate directly to any other test measure. In particular, there is no easy or valid way to relate them to 'months of progress' or any measure of individual development.

1. This means that the mean of 500 for OECD countries relates to the year 2000 for reading, 2003 for mathematics and 2006 for science.

PISA 2009: Achievement of 15-year-olds in Wales

- How do 15-year-olds in Wales fare in reading when compared to other countries?
- And what are their attitudes to reading?

The OECD Programme for International Student Assessment (PISA) is the world's biggest international education survey. PISA assesses the knowledge and skills of young people as they approach the end of compulsory education. Conducted every three years, the PISA survey involved schools and pupils in over 60 countries in 2009.

In the PISA 2009 survey, the main focus was on reading, although there are also results for achievement in maths and science. Nearly 500 schools across England, Wales, Northern Ireland and Scotland took part.

This report covers the results of PISA 2009 for Wales, including:

- achievement of 15-year-olds in Wales in reading (and maths and science) compared to similar groups in other countries
- gender differences in achievement
- pupils' attitudes towards reading
- pupils' reading activities, at school and outside school
- school leadership and school climate
- achievement and attitudes in Wales compared with the rest of the UK.

This is important reading for policy-makers, teachers, local authority staff and all those interested in improving young people's attainment in and attitudes towards reading in Wales.

http://www.nfer.ac.uk/pisa
www.pisa.oecd.org

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