

Learning for Life:

The Achievements of 15-year-olds on Mathematics, Reading Literacy and Science in PISA 2012

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Summary Brochure

Full report and electronic version of this brochure are available on www.erc.ie/pisa

This brochure describes the key findings for Ireland arising from the 2012 cycle of PISA. PISA, or the Programme for International Student Assessment, is a large international study of the OECD. It provides information on the achievements of young adults aged 15 in the core areas of mathematics, reading and science. PISA runs in three-yearly cycles, beginning in 2000, with one subject area becoming the main focus or ‘major domain’ of the assessment in each cycle. In both 2003 and 2012, mathematics was the major focus of the assessment. Reading was assessed as a major domain in 2000 and 2009, while science was a major domain in 2006. Trends in achievement are examined back to when a domain was first assessed as a major domain. In 2012, students in 32 countries, including Ireland, also participated in a computer-based assessment of reading and mathematics.

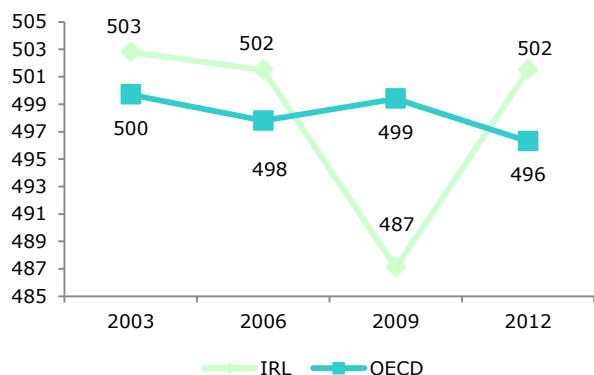
Achievement scores for each domain have an average of 500 across OECD countries and a standard deviation of 100, when the domain is first assessed as a major domain (i.e., in 2000 for reading, 2003 for mathematics and 2006 for science).

Each scale is also divided into proficiency levels, with descriptions of the skills and competencies at each level. There are seven proficiency levels for reading (print and digital), six for mathematics (print and computer-based) and six for science. In each domain, Level 2 is considered the basic level of proficiency needed to participate effectively and productively in society and future learning (OECD 2010), while Level 5 and above represents the skills of the highest-achieving students in PISA.

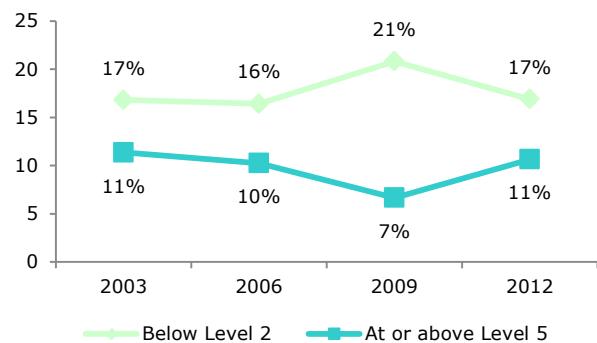
To allow for valid comparisons over time, the OECD average reported for each domain is restricted to the number of OECD countries that participated in PISA when the domain was first assessed as a major domain.

Mathematics

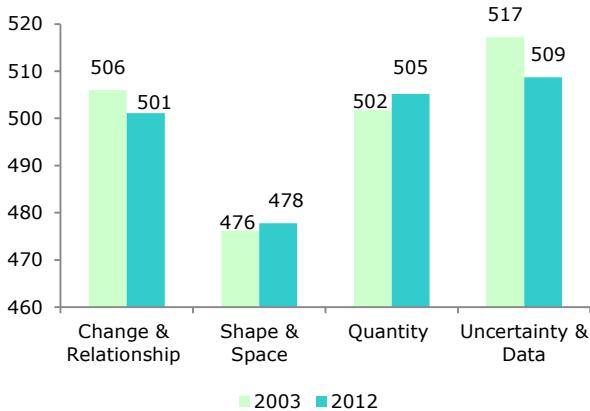
In 2012, students in Ireland have a mean mathematics score of 502, which is significantly above the average across OECD countries (496). The mean mathematics score for Ireland is ranked 13th out of 34 OECD countries and 20th out of all participating countries. Ireland’s mean mathematics performance has increased significantly since 2009, but is not different to the Irish scores in 2003 and 2006.



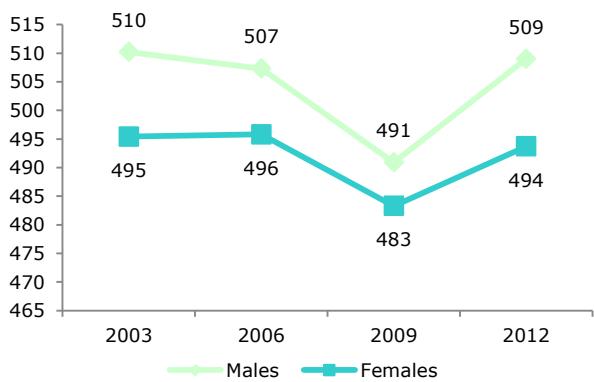
In Ireland, 17% of students have a mathematics score below proficiency level 2, while 11% have a mathematics score at or above proficiency level 5. The proportions of students below Level 2 and at or above Level 5 are about the same as in 2003.



Since 2003, there has been little change in the mean scores of students in Ireland across the four mathematical content areas described in PISA, although performance in the area of Uncertainty & Data has dropped significantly by 8 points. In both cycles, performance on the Space & Shape subscale is considerably lower than in the other content areas.



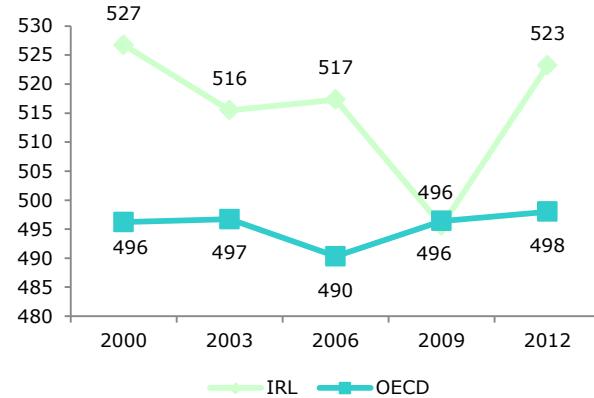
Males outperformed females in mathematics in all cycles since 2003, with significant differences in 2003, 2006 and 2012. The print mathematics performance of male and female students in Ireland is about the same in 2012 as it was in 2003.



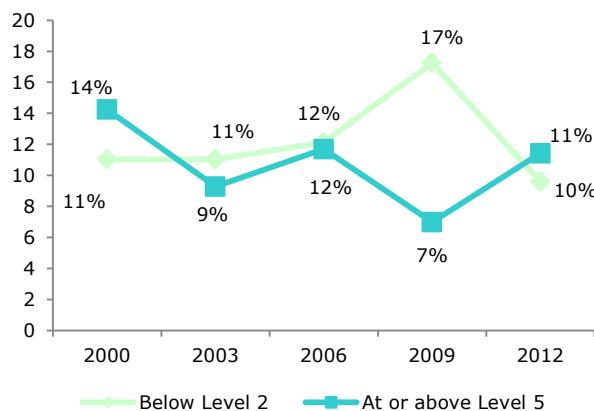
Students in Ireland have a mean score on the computer-based assessment of mathematics of 493, which does not differ significantly from the corresponding OECD coverage (497). Ireland's computer-based mathematics score is ranked 15th among the 23 participating OECD countries and 20th among all 32 participating countries. About 18% of students in Ireland have a computer-based mathematics score below Level 2, while 7% are performing at Level 5 or above. Males significantly outperform females, by 18 points, on computer-based mathematics in Ireland.

Reading

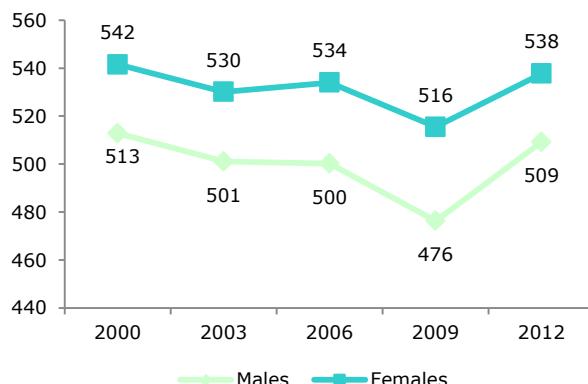
The mean print reading score of students in Ireland in 2012 is 523, which is significantly above the average across OECD countries (498). Ireland's score is ranked 4th out of 34 OECD countries and 7th out of all 65 participating countries. The print reading performance of students in Ireland in 2012 is significantly higher than in 2009, but does not differ from the scores in 2000, 2003 or 2006.



In 2012, 10% of students have a print reading score below Level 2, while 11% have a score at or above Level 5. The proportions of students in Ireland performing below Level 2 and at or above Level 5 are slightly lower than in 2000.



In Ireland and on average across OECD countries, female students significantly outperformed male students in print reading in all cycles of PISA. The scores of males and females in Ireland do not differ significantly from the scores in 2000 but are significantly higher than in 2009.

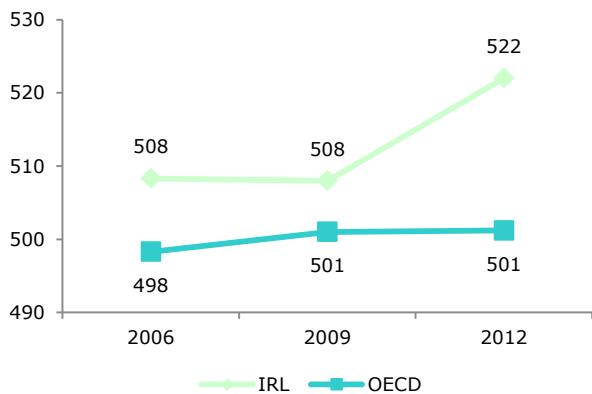


In 2012, Ireland's mean digital reading score is 520 and is ranked 5th among the 23 OECD countries and 9th among all 32 participating countries. Ireland's score in 2012 is significantly higher than in 2009 (509) and in both cycles, Ireland's mean score is significantly above the corresponding OECD average score. The proportion of students below Level 2 on

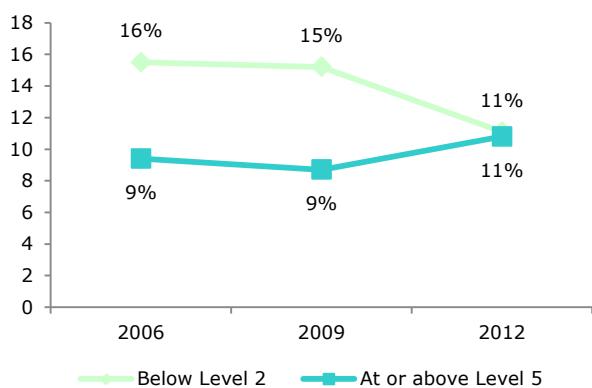
the digital reading scale in Ireland dropped from 12% in 2009 to 9% in 2012. On the other hand, the proportion of students at or above Level 5 increased slightly from 8% to 9%. In Ireland, female students significantly outperformed males on the digital reading scale in both cycles and the scores for both males and females increased between 2009 and 2012 (from 494 to 508 for males and from 525 to 533 for females).

Science

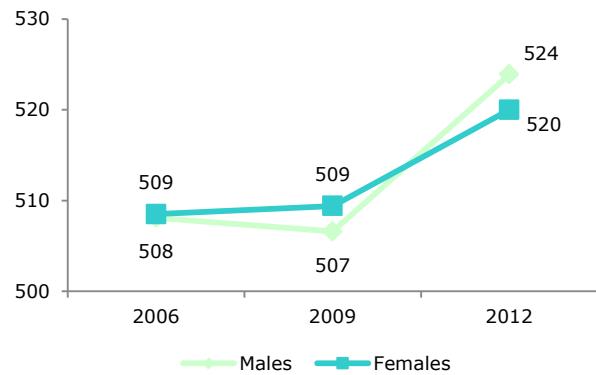
For science, the mean score of students in Ireland in 2012 is 522, which is ranked 9th among 34 OECD countries and 15th among all participating countries. Ireland's mean science score in 2012 is significantly higher than the mean scores in 2006 and 2009 (508 in both cycles). Ireland's science performance is significantly above the corresponding OECD average scores in each cycle since 2006.



The proportion of students performing below Level 2 on the science scale in Ireland has decreased from 16% in 2006 to 11% in 2012, while the proportion of students at or above Level 5 has increased from 9% to 11%.



In 2012, the mean science score of male students in Ireland (524) is slightly but not significantly higher than the score for female students (520). The mean science scores of both male and female students have increased significantly since previous cycles.



What may have contributed to the changes in achievement across cycles?

A number of factors are likely to have contributed to the changes in student performance in Ireland between 2009 and 2012. Firstly, there is evidence that students were less engaged with the PISA tests in 2009, with more students skipping questions than in previous cycles. In 2012, the percentage of students in Ireland skipping questions decreased, indicating that students invested more effort in the assessment in 2012 relative to 2009.

With regard to reading, the OECD has made improvements to the way it measures change over time, so that comparisons of reading scores over time are now more stable than they were for the 2009 cycle.

It is likely that the introduction of social, environmental and scientific education to the primary curriculum in 1999 and the revised junior cycle science syllabus in 2003 have had an impact on the increased **science** achievement in 2012. In contrast, it is likely to be too early for Project Maths to have had any measurable impact on Irish students' **mathematical** knowledge and skills.

Students' attitudes, beliefs and behaviours

PISA can also inform us about students' attitudes, beliefs and behaviours, many of which are related to their performance on the PISA tests. Students in Ireland report significantly more positive attitudes towards school in terms of the perceived effects of working hard in school (0.20) and in terms of their perceptions of schools as being useful (0.11), higher levels of intrinsic (0.06) and instrumental motivation in mathematics (0.13), higher levels of perseverance in learning in general (0.14) and higher levels of subjective norms in mathematics (0.13), compared to the average across OECD countries (0.00 for each index). Students in Ireland also have significantly higher levels of anxiety about mathematics (0.11) than the OECD average (0.00).

In Ireland, students report similar levels of mathematics self-efficacy (0.01), mathematics self-concept (-0.04) and sense of belonging to school (-0.03) to the OECD average (0.00 for each index), while they report significantly lower levels of self-responsibility for failure in mathematics (-0.10), engagement in activities related to mathematics (such as chess or mathematics clubs; -0.43) and mathematics intentions (e.g., to study mathematics courses in college -0.12).

In Ireland, male students have significantly higher levels of instrumental (but not intrinsic) motivation, perseverance, self-efficacy, self-concept, openness to problem solving and mathematics intentions than females. Female students, on the other hand, have significantly higher levels of anxiety about mathematics and self-responsibility for failure in mathematics

Between 2003 and 2012, students' sense of belonging to school has decreased significantly in Ireland, while Irish students' intrinsic and instrumental motivation for mathematics, their mathematical self-efficacy and anxiety about mathematics have increased significantly.

Student and school characteristics associated with achievement

PISA confirms that Ireland has experienced considerable social, economic and demographic changes over the past decade or so. The results for 2012 indicate that the families of students who took part in PISA are significantly more socioeconomically advantaged on average than they were in 2003. In 2012, students in Ireland have a mean socioeconomic or 'ESCS' score (0.13) that is significantly higher than the OECD average (0.00).

The percentage of immigrant students in Ireland has increased from 3% in 2003 to 10% in 2012 and is now about the same as the OECD average (11%). Of the 10% of students in Ireland classified as immigrants, about half speak Irish or English at home (5%) and the rest speak other languages (5%). However, immigrant students speaking a language other than English or Irish do about as well as other students in Ireland on the PISA test, with the exception of print reading, where their mean score is about 20 points lower than their Irish-born counterparts. Immigrant students speaking English

or Irish do equally well as Irish-born students on PISA.

Students who reported engaging in paid work during term time for more than 8 hours per week have significantly lower mean scores in all achievement domains compared with those who do not engage in paid work (by 29 points for print mathematics). Students in Ireland who never attended preschool perform significantly less well (-15 points for print mathematics) than students who have attended for a year or less.

Students attending fee-paying schools have higher average scores than those at non-fee-paying schools, by about 57 points for print mathematics, and also have significantly higher levels of ESCS (0.88 compared to 0.06). Students attending schools in the School Support Programme (SSP) under DEIS perform significantly less well than their counterparts in other schools on all domains, and the difference is almost 60 points for print mathematics. In Ireland, students in boys' secondary schools obtain the highest print mathematics, computer-based mathematics and science scores (521, 513 and 537, respectively), while students in girls' secondary schools have the highest mean scores for reading (544 for print reading and 536 for digital reading). Engaging in paid work, attending preschool, and attending particular kinds of post-primary schools are all characteristics that are themselves related to varying degrees to the socioeconomic characteristics of students.

Students in Ireland report significantly higher levels of teacher support in mathematics classes (0.08), higher levels of mathematics teacher classroom management (0.15) and more positive disciplinary climate in mathematics classes (0.13) than the OECD average (0.00 for all indices). Students in Ireland also report attending schools that offer significantly lower levels of mathematics extracurricular activities (1.81) and where teachers engage in significantly lower levels of formative assessment (-0.07) and student-orientated (differentiation) practices (-0.58) compared to the OECD averages (2.36 for mathematics extracurricular activities and 0.00 for the other indices). School principals in Ireland report significantly higher levels of teacher morale (0.49) compared to the OECD average (0.00).

Further information on PISA

For a full description of the PISA 2012 results for Ireland see www.erc.ie/p12mainreport.

National PISA website: www.erc.ie/pisa OECD's PISA website: www.oecd.org/pisa

Queries on PISA in Ireland: email pisa2012@erc.ie; phone 01 837 3789