

## Launch of Reports for Teachers on PISA Mathematics

To be released at 10am on Friday, 7<sup>th</sup> October, 2016

The Educational Research Centre (ERC) has released two new reports on PISA 2012 mathematics. These reports outline the main conclusions drawn from the PISA 2012 mathematics and problem-solving results for Ireland (and which have already been published in other sources) and are designed to support teachers in their understanding of PISA. Both reports are available at [www.erc.ie](http://www.erc.ie).

These reports are published at the same time as another report by the Organisation for Economic Cooperation and Development (OECD) designed for teachers of mathematics. This report, *Ten Questions for Mathematics Teachers. . . and How PISA Can Help Answer Them*, will be available at <http://www.oecd.org/pisa/> at 2.30pm on Friday 7<sup>th</sup> October, 2016.

### ***A Teacher's Guide to PISA Mathematics and Problem Solving: Findings from PISA 2012***

This report describes findings from three assessments administered as part of PISA in 2012: paper-based mathematics, computer-based mathematics, and computer-based problem solving. Overall performance in each of the three assessment areas is presented as well as school and student factors that are associated with performance. This report also examines the engagement of students with the PISA mathematics tests and compares the performance and attitudes of students in initial Project Maths schools in PISA 2012 to those in all other schools. The report concludes by reflecting on how the findings from PISA are relevant to the teaching and learning of mathematics in Ireland. Implications for teaching and learning in four key areas are considered:

- Performance on Shape and Space;
- Underperformance of high-achieving students;
- Raising expectations for success; and
- Overcoming mathematical anxiety.

Examples of items used to assess paper-based and computer-based mathematics, as well as computer-based problem solving in PISA 2012 are also included.

### ***PISA in Classrooms: Implications for the Teaching and Learning of Mathematics in Ireland***

This report focuses on the main outcomes for students in Ireland of the assessment of mathematics in PISA 2012 and their implications for teaching and learning. Six key themes are addressed and practical strategies for each are outlined. These themes are:

- Improving girls' performance in mathematics;
- Reducing levels of mathematical anxiety;
- Supporting lower-achieving students;
- Improving performance among higher-achieving students;
- Enhancing opportunity to learn mathematics;
- Broadening the use of ICTs in mathematics classes.

Schools, mathematics departments within schools, and teachers are advised to take their particular contexts into account when considering the implications of PISA. Specific recommendations include:

- Raising students' cognitive engagement in mathematics by allowing students to decide on their own procedures when solving problems, assigning problems that can be solved in

different ways, presenting problems in different contexts, giving problems with no immediate solution, and asking students to explain how they solved a problem.

- Postponing implementation of streaming for mathematics for as long as possible and where streaming is applied, implementing flexible assignment to mathematics classes (syllabus levels) so that students who make rapid progress can be promoted to more challenging mathematics classes.
- Ensuring that adequate time is allocated to the teaching of mathematics, especially in Transition Year.
- Ensuring that, in addition to observing teacher-led demonstrations of mathematics processes using ICTs, students have an opportunity to use ICTs on an ongoing basis in their mathematics classes, whether in classrooms or in computer rooms.

#### **Background Note:**

The OECD's Programme for International Student Assessment (PISA) is an international survey of the achievements of 15-year-old students in mathematical, reading and scientific literacy, carried out every three years beginning in 2000. In PISA 2012, 65 countries, including all 34 OECD member countries, participated. All countries took part in the paper-based assessments of mathematics, reading and science, while subsets of countries also participated in computer-based assessments of mathematics, digital reading and problem solving. Ireland participated in all six assessments. The main findings for Ireland were:

- The performance of students in Ireland on the print assessments of mathematics, reading and science (502, 523 and 522, respectively) was above the corresponding OECD averages (494, 497 and 501, respectively).
- Ireland's performance on the computer-based assessment of digital reading was also above the OECD average in 2012 (520 and 497, respectively) while average scores on the computer-based assessments of mathematics (493) and problem solving (498) were not significantly different from the OECD averages (497 and 500, respectively).
- The performance of students in Ireland on print mathematics and reading is statistically significantly higher in 2012 than in 2009, but does not differ significantly from the performance of Irish students in earlier PISA cycles. On the other hand, the average science score of students in Ireland in 2012 was significantly higher than in all previous cycles that can be compared for science. The average digital reading score of students in Ireland also increased significantly between 2009 and 2012. The computer-based assessments of mathematics and problem solving were administered for the first time in PISA 2012.

#### **Further Information:**

- Sample tasks from PISA, including items from the computer-based assessment of problem solving: <http://www.oecd.org/pisa/pisaproducts/pisa-test-questions.htm>
- Results for Ireland on PISA 2012: <http://www.erc.ie/studies/pisa/publications/pisa-2012/>
- OECD's reports on PISA 2012 results the report on problem solving: <http://www.oecd.org/pisa/keyfindings/pisa-2012-results.htm>
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