The 2014 National Assessments of English Reading and Mathematics

Volume I: Performance Report

Gerry Shiel, Lauren Kavanagh and David Millar

EDUCATIONAL RESEARCH CENTRE

The 2014 National Assessments of English Reading and Mathematics

Volume 1: Performance Report

Gerry Shiel
Lauren Kavanagh
David Millar

Educational Research Centre

Cataloguing-in-Publication Data

Shiel, Gerry

The 2014 National Assessments of English Reading and Mathematics. Volume 1: Performance Report / Gerry Shiel, Lauren Kavanagh, David Millar.

Dublin: Educational Research Centre

xvi, 74 pages: illustrations, figures, tables; 30 cm.
Includes bibliographical references.
ISBN: 978 0 900440 46 5

1. Reading (Primary) – Ireland – Evaluation.
2. Mathematics (Primary) – Ireland – Evaluation.
3. Academic achievement.
4. Educational tests and measurements – Ireland.

2014
I Title II Kavanagh, Lauren III Millar, David
371.262–dc23

Printed in the Republic of Ireland by eprint Limited, Dublin.

Table of Contents

Preface

The 2014 National Assessments represent a first opportunity to examine trends in performance in English reading and mathematics in primary schools since 2004. Whereas earlier national assessments involved a range of class levels, in 2009, it was decided to include pupils in Second and Sixth classes only, and to focus on both English reading and mathematics for the same participating pupils.

The 2014 National Assessments occur at a time when the emphasis on literacy and numeracy in schools and classrooms is stronger than it has been for some time. Concerns about standards in literacy and numeracy, including a lack of improvement in National Assessments since the early 1980s, issues raised in inspection reports, and lower-than-expected performance in reading literacy and mathematics among 15-year olds in Ireland in the 2009 OECD Programme for International Student Assessment (PISA), contributed to the development of the *National Strategy to Improvement Literacy and Numeracy among Children and Young People 2011-20*. The National Strategy includes a range of measures designed to improve performance, including targets to be achieved in the context of the National Assessments by 2020. Hence, in addition to allowing for a comparison with performance in primary schools in 2009, the 2014 National Assessments, the first since the publication of the National Strategy, allow for a consideration of the extent to which progress has been made in reaching the targets for primary schools set out in the Strategy.

It is significant that the National Strategy adopts a broad focus. It emphasises the need to support the literacy development of pupils in all sectors of the educational system (early childhood, primary, post-primary, special), at all levels of proficiency. It emphasises the importance of supporting the development of literacy and numeracy in all subject areas – not just in English/Irish and mathematics – and it recognises the need to support colleges, schools, teachers, parents and pupils to work towards raising standards.

Some evidence has emerged in the last few years that standards in reading may not have declined to the extent suggested by PISA 2009. First, the results of the 2011 Progress in International Literacy Study (PIRLS) indicated that pupils in Fourth class in Ireland performed at a high level – 10th among 48 participating countries, with only five countries, including Northern Ireland, performing at a significantly higher level. Second, Ireland ranked 5th of 34 OECD countries, and 7th of all 65 participating countries on print reading on PISA 2012, with an overall mean score that was significantly above the OECD average. Performance on digital reading was also strong. While the outcomes of PISA 2012 for print reading literacy represented an improvement over PISA 2009, Ireland's performance in 2012 was about the same as in pre-2009 cycles of PISA.

While the performance of students in Ireland in international assessments of reading literacy has generally been strong, with the exception of PISA 2009, the same cannot be said of Mathematics. In the mathematics component of the Trends in International Mathematics

and Science Study (TIMSS) in 2011, pupils in Fourth class in primary schools in Ireland ranked 17th of 48 participating countries, with 13 countries, including Northern Ireland, England and the Netherlands, as well as several east Asian countries, achieving significantly higher mean scores than Ireland.

In PISA 2012, 15-year olds in Ireland achieved a mean score on print-based mathematics that was significantly above the average for OECD countries, and ranked 13th of 34 OECD countries and 20th of 65 participating countries/economies. Although this represented an improvement in performance compared with PISA 2009, Ireland's mean score in 2012 was not significantly different from 2003 or 2006. Moreover, as in PISA 2003, students in Ireland performed below the OECD average on the Shape and Space content area, which measures aspects of geometry, problem solving and spatial reasoning. Students in Ireland performed less well on PISA 2012 computer-based mathematics than on print-based mathematics, achieving a score that was not significantly different from the OECD average.

Two Main Reports

For previous national assessments, the Educational Research Centre has published one main report, which typically appeared about a year after the assessments had been implemented in schools. For the 2014 assessments, two reports are to be released. The current report focuses on the performance of pupils on the tests of English reading and mathematics administered as part of the National Assessments. A context report, to be published in 2015, will situate the outcomes in the context of the schools, classrooms and homes of participating pupils. The context report will, for example, link performance to changes in class size and time allocated to teaching English reading and mathematics in classrooms. It will also consider pupil characteristics such as interest in reading and self-concept in mathematics, and relate these to performance.

Overview of the Performance Report

The current report comprises six chapters. The first chapter describes the broad context in which the 2014 National Assessments occurred. It looks closely at the 2009 National Assessments, which served as a baseline against which to compare the outcomes of future assessments. It also considers the outcomes of recent international assessments, noting the strengths and weaknesses of Irish pupils at different levels of performance. The performance of pupils in schools in the School Support Programme (SSP) under DEIS (Delivering Equality of Opportunity in Schools, DES, 2005), including longitudinal outcomes between 2007 and 2013, is also considered. Chapter 2 describes how the samples of schools and pupils in the 2014 National Assessments were selected, and it provides an overview of the tests that were used to assess pupils' reading literacy and mathematics. Chapter 3 provides an overview of the main outcomes of the 2014 National Assessments, and relates these to the 2009 National Assessments outcomes. Performance at Second and Sixth classes is described in terms of percent correct scores, which give an overall indication of test

difficulty, scale scores and proficiency levels. Overall performance in English reading and mathematics is examined, along with performance on key content and process subscales. Chapter 4 focuses on gender differences in performance. Performance is compared with reference to scale scores, on overall scales and on subscales, and to proficiency levels. Chapter 5 looks at disadvantage. It compares the performance of pupils in DEIS Band 1, DEIS Band 2, rural DEIS, urban non-DEIS, and rural non-DEIS schools. The final chapter, Chapter 6, summarises the outcomes of this report, and draws some broad conclusions.

Two additional resources relevant to this report are available online at www.erc.ie/na2014:

- An e-appendix that includes additional detail on the tables in this report, including, for example, confidence intervals for all comparisons of mean scores, and some additional tables.
- Sample items in English reading and mathematics that are being released following NA ’14.

Acknowledgements

The Educational Research Centre wishes to acknowledge the participation of schools, teachers and pupils in the pilot and main phases of the 2014 National Assessments, including teachers who administered the NA ’14 tests to their Second and Sixth classes. The Centre also acknowledges the support of the Inspectorate of the Department of Education and Skills in overseeing implementation of the National Assessments in schools and classrooms, and ensuring that test administration standards were adhered to.

The Centre wishes to acknowledge the support of members of the National Advisory Committee. Its members are:

Caitríona Ní Bhriain (Department of Education and Skills, Chair)
Suzanne Cobbe (Catholic Primary School Management Association)
Seán Delaney (Marino Institute of Education)
Arlene Forster (National Council for Curriculum and Assessment)
Lauren Kavanagh (Educational Research Centre)
Áine Lynch (National Parents’ Council, Primary)
Breda Naughton (Department of Education and Skills)
Deirbhile Nic Craith (Irish National Teachers Organisation)
Máirín Ní Chéileachair (Gaelscoileanna)
Aedín Ní Thuathail (Irish Primary Principals’ Network)
Gerry Shiel (Educational Research Centre)
Mia Tracey (Professional Development Service for Teachers), replacing Ciara O’Donnell (Oct., 2014)

As authors, we wish to acknowledge the support of colleagues at the Educational Research Centre, including Peter Archer, the Acting Director, who provided feedback on earlier drafts of this report, Hilary Walshe, who typeset the test booklets and questionnaires, Mary Rohan, Paula Chute, and John Coyle, who provided logistical support, Joanne Kiniry and Seán Close, who co-ordinated item development and helped implement the pilot study in 2013, and Katie Gilligan, who helped with proofing this report.

Gerry Shiel
Lauren Kavanagh
David Millar
December, 2014

Abbreviations

CPD	Continuing Professional Development
DES	Department of Education and Skills
DEIS	Delivering Equality of Opportunity in Schools
IEA	International Association for the Evaluation of Educational Achievement
IRT	Item Response Theory
NA ’09	The 2009 National Assessments of English Reading and Mathematics in primary schools
NA ’14	The 2014 National Assessments of English Reading and Mathematics in primary schools
NCCA	National Council for Curriculum and Assessment
OECD	Organisation for Economic Co-operation and Development
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
PSEC	Primary School English Curriculum
PSMC	Primary School Mathematics Curriculum
SE	Standard error
SEC	State Examinations Commission
SSP	School Support Programme under DEIS
TIMSS	Trends in International Mathematics and Science Study

Statistical Terms

The following are key statistical terms used in this report:

Correlation Coefficients	Correlation coefficients describe the strength of a relationship between two variables such as Reading Vocabulary and Reading Comprehension. The value of a correlation (the r value) ranges from -1 to + 1. A positive correlation indicates that, as one variable increases, the other does too, while a negative correlation indicates that as one increases the other decreases.
Effect Sizes	An effect size is a standardised measure of the difference between two mean scores that is expressed in standard deviation units. Effect sizes in this report were computed using Cohen's d (Cohen, 1988). According to the What Works Clearinghouse (2014), an effect size of 0.25 or higher on school-based research can be considered 'substantively important' (that is, the impact on achievement is strong), whether or not the underlying difference is statistically significant. Effect sizes greater than 0.50 are considered large.
Mean Percent Correct Scores	The mean percent correct scores achieved by pupils in NA '09 and NA '14 are provided for informational purposes only. These are based on item pools that have been modified between the two assessments. Comparisons between groups across National Assessments, and within NA '14, should not be made using percent correct scores. Instead, scale scores should be used.
Mean Scale Scores	In NA '09, mean scores on all scales and subscales in English reading and mathematics were set to 250 points, and standard deviations to 50. Scores achieved by pupils participating in NA '14 were projected onto the same scales and subscales as those used in NA '09 using Item Response Theory (IRT) scaling.
Proficiency Levels	In NA '09, pupils were assigned to proficiency levels on the overall reading and mathematics scales in Second and Sixth classes, such that, for each domain, at both class levels, 10% of pupils were assigned to Level 4 (the highest level), 25% to Level 3, 30% to Level 2, 25% to Level 1, and 10% to 'below Level 1'.
Statistical Significance	If the difference between two mean scores is statistically significant, it means that there is a 95% (or higher) chance that the difference is real. A statistical test has been carried out to establish this. Where multiple comparisons are carried out, alpha levels have been adjusted to reduce error.
Standard Deviation	The standard deviation is a measure of the dispersion of a set of data from its mean score. The more spread apart the data, the higher the deviation. In a normal distribution, 68% of the scores are within one standard deviation of the mean, 95% within two standard deviations, and 99% within three.
Standard Error	Scores reported in this report are *estimates*, based on the sample of pupils selected. However, it is unlikely that the 'true' national mean is exactly the same as the sample mean. Some variation or error around scores is to be expected. Thus, each mean has a standard error, which allows us to estimate how accurately the mean found in our sample reflects the 'true' mean in the population. The 'true' mean score can be found in an interval that is 1.96 standard errors on either side of the obtained mean, 95% of the time.

Key Findings and Conclusions

The 2014 National Assessments of English Reading and Mathematics (NA ’14) were administered by class teachers, under the supervision of inspectors of the Department of Education and Skills, to representative samples of over 8,000 pupils in Second and Sixth classes in 150 primary schools in May 2014.

The current report focuses on the performance of pupils in NA ’14 and relates their performance to that of pupils who participated in the National Assessments in 2009 (NA ’09). A second report, which will be published in 2015, will examine factors relating to the teaching and learning of English Reading and Mathematics, using school-level, classroom-level, pupil-level and parent-level data, drawn from questionnaires administered in conjunction with NA ’14.

The tests used in NA ‘2014 were secure curriculum-based instruments developed for the 2009 National Assessments and updated for NA ’14 through the inclusion of a small number of new items to replace those that were released following NA ’09. At each class level, there were multiple test booklets in each domain, allowing for greater coverage of content and processes. Item Response Theory (IRT) scaling was used to link booklets, and to place performance in 2014 on the same scales developed for NA ’09. All scales developed for NA ’09 had been set to a mean score of 250 and a standard deviation of 50. In addition, fixed percentages of pupils were assigned to proficiency levels in each domain at each class level, such that 10% of pupils performed below Level 1, 25% at Level 1, 30% at Level 2, 25% at Level 3 and 10% at Level 4.

Findings related to the performance of pupils in schools in the School Support Programme under DEIS, particularly those for rural DEIS schools, should be treated with caution, as they are based on small sample sizes, and precise estimates of performance and change cannot be computed.

Key Findings

The following are the key findings reported in the performance report:

Performance on Reading

- Overall performance on reading in Second class was significantly higher in NA ’14 than in NA ’09, by 14 score points. The corresponding effect size was 0.29, which can be interpreted as being ‘substantively important’ (that is, they can be considered important in the context of educational studies). Significant performance increases of similar size were observed on the Reading Vocabulary and Reading Comprehension component subscales, and on the Retrieve, Infer and Integrate & Interpret process subscales.

- Overall performance on English reading in Sixth class was significantly higher in NA 14 than in NA '09, by 13 score points. The corresponding effect size, 0.26, can also be considered substantively important. Significant performance increases were also observed for Reading Vocabulary and Reading Comprehension component subscales, and for the Retrieve, Infer, Integrate & Interpret and Examine & Evaluate process subscales. Pupils in Sixth class made less progress on the Examine & Evaluate subscale than on the other process subscales; however, given the relatively small number of items assessing the Examine & Evaluate process, scores on this subscale should be interpreted with caution.
- In NA '14, 22% of pupils in Second class performed at or below Proficiency Level 1 on overall reading, compared with 35% in NA '09, while 46% performed at Levels 3 and 4 combined, compared with 35% in NA '09. At Sixth class, 25% performed at or below Level 1, again compared with 35% in NA '09, while 44% performed at Levels 3 and 4 combined, compared with 35% in NA '09.

Performance on Mathematics

- Overall performance on mathematics in Second and Sixth classes was significantly higher in NA '14 than in NA '09, by 14 score points and 12 score points, respectively. The effect size at Second class was 0.28 and at Sixth class was 0.24, both of which can be interpreted as being substantively important (that is, they can be considered large).
- At Second class, significant increases in performance were observed on three of four content areas assessed, and on all five mathematics processes. The exception was the Data content area, where the increase was just 4 score points.
- Twenty-six percent of pupils in Second class performed at Proficiency Level 1 or below on overall mathematics, compared with 35% in NA '09. Forty-seven percent performed at Levels 3 and 4 combined, compared with 35% in NA '09. At Sixth class, 27% performed at or below Level 1, and 42% performed at Levels 3 and 4 combined.
- At Sixth class, there were significant increases on all four content areas, and on all five processes.

Gender Differences in Performance

- In NA '14, girls in Second class significantly outperformed boys on the overall reading scale by 7 score points. This corresponding difference in favour of girls in NA '09 was 14 points. There was a 17 percentage point decrease in the proportion of boys, and a 10-point decrease in the proportion of girls who performed at or below Proficiency Level 1 on the overall reading scale in NA '14, compared with NA '09. There was a 13 percentage point increase in the proportion of boys and an 8 percentage point increase in the proportion of girls performing at Levels 3-4.

- At Sixth class, girls in NA ’14 achieved a mean score on overall reading that was higher than that of boys by 4 score points. The difference was not statistically significant. At Sixth class, there was an 11 percentage point decrease in the proportion of boys performing at or below Level 1, and a 9 percentage point decrease in the proportion of girls performing at or below Level 1, compared with NA ’09. There was a 7-point increase in the proportion of boys and an 11-point increase in the proportion of girls performing at Levels 3-4.
- Boys in Second class had a higher mean score on overall mathematics than girls in NA ’14, and the difference (5 points) was statistically significant. Boys significantly outperformed girls on the Measures, Data, and Apply & Problem Solve subscales, but did not differ significantly from girls on any of the other content or process subscales. The proportion of Second class boys performing at or below Level 1 decreased by 10 percentage points and the proportion of girls performing at or below Level 1 decreased by 9 points. The proportion of boys performing at or above Level 3 increased by 13 percentage points, and the proportion of girls increased by 12 percentage points.
- At the Sixth class level, boys in NA ’14 had a 4-point advantage over girls, but the difference was not statistically significant. Boys had a significantly higher mean score than girls on Measures and Apply & Problem Solve; there were no differences on the other content or process subscales. The proportion of boys performing at or below Level 1 on the overall mathematics scale decreased by 7 percentage points, while the proportion of girls performing at the lowest levels decreased by 8 percentage points. There was a 6 percentage point increase in the proportion of boys and a 6-point increase in the proportion of girls performing at or above Level 3.

Performance of Pupils in Schools in SSP under DEIS

Caution should be exercised in interpreting the outcomes in this section, due to small numbers of pupils in DEIS schools selected to participate in the National Assessments, and the large standard errors associated with estimates such as mean scores and differences.[1]

- Pupils in Second class in DEIS Band 1 schools achieved a mean score on overall reading in NA ’14 that was 14 points higher than in NA ’09, and the difference was statistically significant. The corresponding effect size (0.35) can be interpreted as being substantively important. Pupils in Second class in Band 2 schools had a mean score on overall reading in NA ’14 that was significantly higher (by 27 points) than the NA ’09 score for Band 2 schools. The effect size (0.60) can be interpreted as being large in the context of a study such as NA ’14.
- In Sixth class, the mean overall reading score of pupils in Band 1 schools in NA ’14 was some 13 points higher than in NA ’09. The difference was not statistically

[1] Although reported in Chapter 5, no reference is made to performance in DEIS rural schools here, as too few such schools were selected to take part in NA ’14.

significant, but it converts to an effect size (0.29) which can be interpreted as being substantively important. Pupils in DEIS Band 2 schools had a higher mean score in NA ’14 than in NA ’09. The difference, 14 score points, was statistically significant. The effect size was the same as for Band 1 schools (0.29).

- In Second class Mathematics, pupils in Band 1 schools in NA ’14 had a mean score that was 13 points higher than in NA ’09, though the difference was not statistically significant. However, the effect size (0.28) can be considered to be substantively important. In Band 2 schools, there was a significant increase of 29 score points in overall mathematics at Second class, and an effect size of 0.62, which can be interpreted as being large.
- Pupils in Sixth class in Band 1 schools in NA ’14 had a mean score on overall mathematics score that was higher than that of pupils at the same class level in NA ’09. While the difference of 14 points was not statistically significant, the effect size of 0.29 can be interpreted as being substantively important. There was a smaller increase in mathematics in Sixth class in Band 2 schools, but the 10 point difference was not statistically significant. The effect size, 0.21, was also relatively small. For English reading and mathematics at Second and Sixth classes in both Band 1 and Band 2 schools, there were significant reductions in the proportions of pupils performing at or below Proficiency Level 1, and increases in the proportions of pupils performing at Levels 3-4. However, in the case of Band 1 schools in particular, there are still large proportions of pupils performing at the lowest proficiency levels.

Conclusions

The following conclusions are drawn from the outcomes:

Performance on English Reading and Mathematics

- NA ’14 represents the first National Assessment since 1980 in which there have been statistically significant increases in performance on English reading and Mathematics. Hence, the significant increases in average performance on overall English reading and mathematics in Second and Sixth classes between NA ’09 and NA ’14, and the ‘substantively important’ effect sizes reported here, are to be welcomed. It is especially noteworthy that these improvements were observed in the context of a national education system, rather than in a small-scale intervention study where change can be implemented more uniformly.
- Additional opportunities to gauge the performance of pupils in primary schools will occur in forthcoming international studies, including TIMSS 2015 and PIRLS 2016, in which pupils in Fourth class in Ireland will take part. The outcomes of these studies should indicate whether the increases in performance reported here have been sustained and are transferable to other contexts. Based on NA ’14, pupils in Ireland

should improve their performance on both assessments, though performance on mathematics may continue to lag behind performance on reading literacy.

- Reductions in the proportions of lower-achieving students in Ireland, in both reading literacy and mathematics in NA ’14, are encouraging, with just 5-6% of pupils performing below Proficiency Level 1, compared with 10% in NA ’09. There are also indications of improved performance among higher-achieving pupils, though to a lesser extent for mathematics than for reading.
- There is scope for pupils in Second and Sixth classes to improve further on higher-level mathematical processes, including Apply & Problem Solve.

Literacy and Numeracy Strategy

- The National Strategy included a number of targets relating to increasing the proportions of pupils performing at the highest proficiency levels in English reading and mathematics, and reducing the proportions performing at the lowest levels. All of these targets have been attained well in advance of the scheduled target date of 2020. There may now be value in reviewing the targets.
- The relatively large increases in performance observed in NA ’14 suggest that the norms for existing school-based standardised tests may overestimate pupil performance, and hence may not be very useful for the purposes for which they are being used, such as setting school-level targets and identifying students with learning difficulties. This points to a need to benchmark performance on standardised tests used in schools against performance in NA ’14, with a view to revising and renorming tests, perhaps in parallel with the implementation of revised curricula in English and Mathematics.
- The National Strategy referred to a need to raise awareness of the importance of digital literacy and to include a measure of digital literacy as part of the National Assessment of English reading. The inclusion of a test of digital reading in PIRLS 2016 (the e-PIRLS assessment) should provide some initial insights into the performance of pupils in Fourth class on digital reading tasks, and also point to infrastructural issues that could arise if digital literacy were to be assessed in future National Assessments of English reading. It would also seem important, both in the context of developing and implementing the revised mathematics curriculum at primary level, and in planning for future National Assessments of Mathematics, to ensure that adequate attention is paid to the effective use of ICTs in mathematics lessons.

Gender Differences

- Gender differences in NA ’14 were relatively small, with a significant difference of 7 points in favour of girls on overall reading in Second class (down from 14 points in NA ’09), and a non-significant difference of 4 points in favour of girls in Sixth. Boys achieved higher mean scores than girls in overall mathematics at Second and Sixth

classes, though the difference was only significant at the Second class level. Boys had significantly higher mean scores on Measures and Apply & Problem Solve at both class levels, as well as a significantly higher score on Data in Second class.

- The finding of no significant difference between girls and boys on reading literacy in Sixth class in NA ’14 contrasts with PIRLS 2011, where there was a significant difference in favour of girls in Ireland in Fourth class. It also contrasts with PISA 2012, where there was a large difference (over one-quarter of a standard deviation) in favour of girls. It may be that the texts and associated questions in NA ’14 are equally-well suited to girls and boys.
- The finding of a small but significant difference in favour of boys on overall mathematics in Second class represents a change from NA ’09, where no gender differences were found on overall mathematics at that class level. A small but non-significant difference in favour of boys on overall mathematics Sixth class in NA ’14 is consistent with TIMSS overall mathematics, where boys in Fourth class in Ireland were slightly but not significantly ahead of girls. Unlike NA ’14, no differences on mathematics content and processes subscales on TIMSS mathematics were statistically significant.

Disadvantage

- The effect sizes for overall reading suggest that, while substantive improvements have been made in DEIS schools since NA ’09, there has been no real reduction in the gap between pupils in DEIS urban schools and in other school types, except at Second class in Band 2 schools. It may be necessary to support the teachers, parents and children in DEIS Band 1 schools even more intensively over the remainder of the National Strategy to reduce the gap with pupils in other school types. It would also seem important to ensure that pupils in the senior classes in DEIS Band 2 build on the large improvements observed in Second class in the current study.
- With the exception Second class in Band 2 schools, there are still disproportionately large numbers of struggling readers in DEIS urban schools, and, except for pupils in Second class in Band 2 schools, progression through the proficiency levels between NA ’09 and NA ’14 has been slow.
- The data for mathematics in DEIS schools indicate that there is still considerable scope for improvement. Indeed, with the exception of DEIS Band 2 schools in Second class, improvements in performance have only kept pace with those of pupils in schools in general, and performance is still well below national standards.
- The outcomes of NA ’14 for DEIS urban schools are broadly consistent with those reported by Weir and Denner in 2013 for their longitudinal evaluation of performance of pupils in schools in SSP under DEIS, where significant improvements in performance were reported, albeit on different measures of achievement than those used in NA ‘14.

Chapter 1: Introduction

National assessments involving representative samples of schools and pupils have been conducted in Ireland since 1972. The most recent assessment, which involved pupils in the Second and Sixth classes, was implemented in 2014, when pupils sat tests of English Reading and Mathematics, and the pupils, their principals, their teachers and their parents completed questionnaires. An earlier assessment, conducted in 2009, also involved English reading and mathematics at Second and Sixth classes. Hence, in addition to reporting on performance in English reading and mathematics in 2014, performance in 2014 is compared with performance in 2009.

This chapter comprises four sections. First, the key outcomes of the 2009 National Assessments are reviewed. Second, the performance of students in Ireland in recent international assessments, including PIRLS, TIMSS and PISA, is considered. Third, research on changing standards in schools in the School Support Programme under DEIS is examined. Fourth, links between the *National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020* (DES, 2011a) and the National Assessments are considered.

The 2009 National Assessments

National assessments of educational achievement are one important source of information on national standards. National assessments have been administered in Ireland since 1972. These have involved the administration of secure tests by trained test administrators (often inspectors) to pupils in a representative national sample, the gathering of context information from pupils, school principals, teachers and parents, and the subsequent analysis of the data and reporting of the outcomes.

With the exception of reading between 1972 and 1980, no national assessments have shown growth in average performance. For example, there was no change in performance in reading in Fifth class between 1998 and 2004 (Eivers, Shiel, Perkins & Cosgrove, 2005), or in mathematics in Fourth class between 1999 and 2004 (Shiel, Surgenor, Close & Millar, 2006), even though new curricula had been introduced in 1999. However, even if changes in Overall performance are not observed, the outcomes of national assessments can provide valuable information on the relative strengths and weakness of pupils on particular items or clusters of items, their attitudes and motivations, the supports they receive at home and at school, and other factors associated with their performance. These outcomes can, in turn, contribute to policy initiatives that can make the educational system more effective.

Prior to 2009, national assessments were administered at a range of grade levels. For example, in 2004, an assessment of English reading was administered in First and Fifth classes, and an assessment of mathematics in Fourth class. Since 2009, national assessments

have been administered in Second and Sixth classes, and have involved both reading literacy and mathematics at these class levels.

Preparation for the 2009 National Assessments involved the development and piloting of new tests and questionnaires for Second and Sixth classes (see Eivers, Millar, Clerkin & Close, 2010). Test frameworks based on the 1999 Primary School English and mathematics curricula (DES, 1999a, 1999b) were established. Following piloting in 2008, four test booklets were developed for reading at both grade levels for the main study in 2009, allowing booklets to be rotated within classes, and ensuring greater content coverage. Four booklets for maths at Second class and six booklets for Maths at sixth were also developed for 2009. Each test booklet within a domain included items that were also common to other booklets at the same grade level. The inclusion of common items within grade levels facilitated linking across test booklets during scaling.

In scaling the 2009 tests, the mean (average) score for each scale (overall, and by component, content area and process), at both Second and Sixth classes, was set to 250, while the standard deviation was set to 50. Proficiency levels were also developed, such that, at each class level, 10% of students were identified as performing at the highest proficiency level (Level 4), 25% at Level 3, 30% at Level 2, 25% at Level 1, and 10% below Level 1. For each of Levels 1-4, descriptions of the content and processes that students would be expected to demonstrate were developed.

In NA ’09, girls had a significantly higher overall reading score than boys at Second class, but not at Sixth. Overall differences on reading at Second, and mathematics at Second and Sixth classes were not statistically significant. Where significant differences on subscales were observed, they tended to be small and favoured girls in reading literacy and boys in mathematics.

In the year following NA ’09, the assessment was replicated in a representative national sample of Gaeltacht schools and Scoileanna Lán-Ghaeilge in order to compare standards in English reading and mathematics in schools in general with those in Irish-medium schools (see Gilleece, Shiel, Clerkin & Millar, 2012). The assessment was necessary because there was a need for information on standards in Irish-medium schools, and the numbers of Irish-medium schools and pupils in the NA ’09 sample were insufficient for meaningful comparisons to be drawn. The study found that pupils in the Second and Sixth classes in Gaelscoileanna and in Sixth class in Gaeltacht schools had significantly higher achievement on reading literacy than pupils in general in NA ’09, while pupils in Second class in Gaelscoileanna and Sixth class in Gaeltacht schools had significantly higher achievement in Mathematics.

In preparing for the 2014 assessments, some minor modifications were made to the test booklets used in 2009 and 2010 as items that were publicly released were replaced (see Chapter 2). The inclusion of new items was facilitated by Item Response Theory (IRT) scaling,

which allows for some old items to be dropped and some new ones to be added in each cycle. Questionnaire items were also revised to focus on, for example, implementation of new policy initiatives in schools and classrooms.

International Assessments

This section reviews the performance of pupils in Ireland in international assessments that have been reported on since the 2009 National Assessments of English Reading and Mathematics. In addition to the PIRLS and TIMSS assessments administered at primary level, PISA is considered here because gaps in performance on PISA may be indicative of issues in curriculum, teaching or learning at either primary or post-primary levels, or both. International assessments differ from national assessments in that performance can be compared across countries. However, the content of the tests that are administered may not fully cohere with national curricula.

PIRLS and TIMSS (Primary Level)

Ireland participated in two international assessments sponsored by the International Association for the Evaluation of Educational Achievement (IEA) at primary level in 2011 – the Progress in International Reading Literacy Study (PIRLS), and the Trends in Mathematics and Science Study (TIMSS). 2011 represented the first occasion in which Ireland had participated in an international study of reading literacy at primary level since 1991 (when Ireland participated in the IEA Reading Literacy Study), and the first in mathematics (and science) since 1995 (when Ireland took part in the IEA's Third International Mathematics and Science Study). Neither PIRLS 2011 nor TIMSS 2011 established direct links back to these earlier studies so trends cannot be examined. Although TIMSS 2011 was offered in Fourth class and Eighth grade (second year), Ireland participated at Fourth class only.[2]

Both PIRLS and TIMSS were implemented in the same classrooms with a nationally representative sample of pupils in March 2011 – some four months before the launch of the *National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-20*. On PIRLS reading, pupils in Fourth class in Ireland ranked 10th of 45 participating countries, with a mean score that was significantly higher than the international median.[3] Just five countries had significantly higher mean scores than Ireland (Hong Kong, the Russian Federation, Finland, Singapore and Northern Ireland) while eight had mean scores that were not significantly different from Ireland's (the United States, Denmark, Croatia, Chinese Taipei, England, Canada, the Netherlands, and the Czech Republic). Fifteen percent of students in Ireland performed at or below the low PIRLS reading benchmark (a broad indicator of low performance in reading), compared to 20% at the international median. Sixteen percent of pupils in Ireland performed at the advanced PIRLS benchmark, and this

[2] In 2015, Ireland will participate in TIMSS at both primary (Fourth class) and post-primary (Second year) levels.
[3] Rather than an international average, PIRLS reports the international centrepoint or median, which was set at 500 in PIRLS 2011.

compared favourably with high-scoring countries such as Northern Ireland (19%) and Finland (18%), as well as with the corresponding PIRLS median percentage (8%). In Ireland, girls outperformed boys by 15 points[4] on the overall reading scale – some two points below the international average difference of 17 points (also in favour of girls). Whereas girls in Ireland outperformed boys by 22 points on literary texts, the difference for informational texts was just 12 points.

In the mathematics component of TIMSS 2011, pupils in Fourth class in Ireland ranked 17th of 48 participating countries, with a mean score that was significantly above the international median. Countries with significantly higher mean scores than Ireland included Finland, England, the United States and Northern Ireland. A feature of TIMSS 2011 mathematics was the exceptionally strong performance of students in east-Asian countries such as Singapore, South Korea, Hong Kong-China and Chinese Taipei, all of whom had scores that were three quarters of a standard deviation higher than Ireland's[5]. Twenty-three percent of students in Ireland performed at or below the low benchmark on the TIMSS overall mathematics scale, compared to an international median of 31%, 15% in Northern Ireland, and fewer than 5% in Singapore, Korea and Hong Kong-China. Just nine percent of pupils in Ireland performed at the advanced benchmark, compared to an international median of 4%, 24% in Northern Ireland and over 35% Singapore, Korea and Hong Kong-China. In Ireland, there was no significant difference in the overall performance of boys and girls.

In an in-depth analysis of the PIRLS and TIMSS results (Eivers & Clerkin, 2013), it was noted that the National Assessments of reading literacy in Ireland tend to be more difficult for Irish pupils than PIRLS, which is targeted at a broader range of reading ability among pupils in 45 countries, including some countries in which pupil achievement is much lower than in Ireland. It was also noted that PIRLS pupils in Ireland tended to do less well on PIRLS items requiring them to identify and provide support in respect of traits of a leading character, and to articulate in writing the lesson they had learned from a story. Higher-level questions in general were more challenging for Irish pupils, compared with questions requiring more basic thinking.

In relation to TIMSS Mathematics, the report noted that just 13 of the 175 mathematics items were not represented on the primary school mathematics curriculum, and these related to coordinates, rotational symmetry, volume of cuboids, speed, factors and multiples, and ratio and proportion. The report also pointed to an over-emphasis in Ireland (in terms of time allocated by teachers) to the Number content area, compared with Geometric Shapes & Measures, and Data Display. Similarly, a lower allocation of time to teaching the mathematical processes of Reasoning and Applying was noted, compared with the more basic process of Knowing.

[4] Fifteen points is about one-sixth of an international standard deviation (set at 100 in PIRLS 2001).
[5] The TIMSS mathematics international standard deviation was set at 100 points in 1995.

The Programme for International Student Assessment (PISA) (Post-primary Level)

In the OECD PISA study in 2009 (PISA 2009), where reading literacy was a major assessment domain, and maths and science were minor domains, the performance of Ireland's 15-year olds on both print-based Reading literacy and mathematics was significantly lower than in earlier cycles. Ireland's mean score on reading literacy was 31 points lower on the PISA reading scale – or about one-third of an international standard deviation – compared with PISA 2000[6] and was not significantly different from the average score for OECD countries. Ireland's ranking dropped from 5th to 17th among OECD countries that participated in both years. Seventeen percent of students in Ireland achieved below Proficiency Level 2 (an indicator of low performance on reading literacy) in 2009, compared with just 11% in 2000. Low performers in 2009 comprised 23% of males and 11% of females. Ireland performed somewhat better on an assessment of digital reading skills, administered as part of PISA 2009 to a subsample of students taking the print-based reading assessment. Ireland's mean score was significantly above the average for 16 OECD countries administering the assessment, and ranked 7th among those countries.

Fifteen-year olds in Ireland achieved a mean score on PISA 2009 print-based mathematics that was significantly below the OECD average, whereas performance in 2003 had not been significantly different from the OECD average. Ireland's decline – 16 points, or one-sixth of an international standard deviation – was the second largest recorded by OECD countries that participated in both PISA 2003 and PISA 2009. Ireland's ranking dropped from 20th to 26th among OECD countries participating in both years. In line with this, the proportion of students in Ireland performing below Proficiency Level 2 in mathematics increased from 17% in 2003 to 22% in 2009. Although male students in Ireland achieved a mean score that was 8 points higher than females on PISA 2009 overall mathematics, the difference was not statistically significant. Slightly more males (22%) than females (21%) performed below Level 2. Just 7% of students in Ireland performed at the highest proficiency levels (5 and 6), compared with an OECD average of 13%.

Not unexpectedly, there was considerable concern in Ireland when the outcomes of PISA 2009 were released in December 2010. A number of reasons were put forward as to why performance in Ireland declined to such an extent in such a short period of time. Some, such as possible differences in the structure of the PISA sample in Ireland in 2009 and in earlier cycles (e.g., LaRoche & Cartwright, 2010) and a decline in performance at primary level (e.g., Perkins, Moran, Cosgrove & Shiel, 2010) were examined and ruled out. Others, such as demographic changes and changes to the PISA assessments were judged to have contributed to the observed changes in performance, though it was not possible to specify their precise contributions. According to Perkins, Cosgrove, Moran and Shiel (2010), factors that may have contributed to lower performance included:

[6] For each assessment domain, PISA compares performance with the cycle in which the domain was a major assessment domain. Thus, PISA 2009 reading is compared with PISA 2000 reading, and PISA 2009 maths is compared with PISA 2003 maths.

- An increase in the proportion of students with special education needs compared with earlier PISA cycles
- An increase in the proportion of students in Transition year, and a reduction in the proportion in Fifth year compared with earlier cycles
- Increases in the proportions of immigrant students, and students who spoke a first language other than English
- Lower engagement with PISA by students such that greater proportions of students in Ireland, than on average across OECD countries, omitted items on blocks appearing later in the assessment, compared with the same blocks when they appeared earlier
- Changes to the PISA assessment specifications, with, for example, fewer written response items in 2009 compared with earlier cycles
- The presence in the sample of eight schools with exceptionally low performance levels
- PISA's approach (at that time) to estimating changes in achievement, with, for example, a relatively small number of link items in reading literacy in 2009.

PISA was implemented again in 2012, with mathematics as a major assessment domain, and reading literacy, science and creative problem solving as minor domains. Both reading and mathematics were offered in print- and computer-based formats. Fifteen-year olds in Ireland achieved mean scores on both print-based and computer-based reading that were above the corresponding OECD average scores. Ireland's ranking on print reading was 4th of 34 OECD countries, and 7th of all 65 participating countries/regions. Five countries/economies had significantly higher mean scores than Ireland – Shanghai-China, Hong Kong-China, Singapore, Japan and Korea. Finland, Chinese Taipei, Canada and Poland performed at about the same level as Ireland. In Ireland, 10% of students performed below Proficiency Level 2, compared to an OECD average of 18%. Students in Ireland performed at about the same level on print reading literacy in PISA 2012 as their counterparts in cycles of PISA that occurred before 2009. On digital reading, Ireland ranked 5th among 23 participating OECD countries, and 9th among all 32 participating countries/economies. Nine percent of students in Ireland performed below Proficiency Level 2, compared with an OECD average of 18%.

Table 1.1: Summary of the performance of pupils in Ireland in recent international assessments involving reading and/or mathematics

Study/Year	Performance on Print-based Reading Literacy	Performance on Digital Literacy	Performance on Print-based Mathematics	Performance on Computer-based Mathematics
PISA 2009 (15-year olds)	Mean score not significantly different from OECD average; 17% below Proficiency Level 2.	Mean score significantly above OECD average; 12% below Proficiency Level 2.	Mean score significantly below OECD average; 21% below Proficiency Level 2.	Not administered.
PIRLS 2011 (Fourth class)	Mean score significantly above international average; 15% at or below Low benchmark	e-PIRLS to be administered for first time in 2016.	Not applicable	Not applicable
TIMSS 2011 (Fourth class)	Not applicable	Not applicable	Mean score significantly above international average; 23% at or below Low benchmark	Not applicable
PISA 2012 (15-year olds)	Mean score significantly above the OECD average. 10% below Proficiency Level 2.	Mean score significantly above OECD average; 9% of students below Proficiency Level 2	Mean score significantly above OECD average; 17% below Proficiency Level 2	Mean score not significantly different from the OECD average; 18% below Proficiency Level 2.

Fifteen-year olds in Ireland achieved a mean score on PISA 2012 print-based mathematics that was significantly above the corresponding OECD average. This was the first PISA cycle in which Ireland performed above the OECD average on mathematics. Ireland ranked 13th of 34 OECD countries and 20th of 65 participating countries/economies. The highest performing countries/economies included Shanghai-China, Singapore, Hong Kong-China, Chinese Taipei and Korea. Seventeen percent of students in Ireland performed below Proficiency Level 2, compared with an OECD average of 23%. On PISA 2012 computer-based mathematics, students in Ireland achieved a mean score that was not significantly different from the OECD average, though the gap between Ireland and the highest-performing countries (Singapore, Shanghai-China, Korea, Hong Kong-China and Macao-China) was

smaller than for print-based mathematics. In Ireland, 18% of students performed below Proficiency Level 2, compared with an OECD average of 20%, while 11% performed at or above Level 5, compared with 13% on average across OECD countries.

While the performance of students in Ireland on the PISA 2012 mathematics content area subscales was broadly in line with their overall performance, students in Ireland achieved a mean score on the Space & Shape subscale (478) that was significantly below the corresponding OECD average (490), with female students performing particularly poorly (466, compared to 490 for males).

Although a new mathematics syllabus, Project Maths, had been implemented in Ireland on a phased basis since 2008, over 80% of students in Ireland participating in PISA 2012 (those in Third and Transition years) had not studied under Project Maths. An analysis of the performance of students in PISA 2012 who had studied under Project Maths and those who had not may be found in Merriman, Shiel, Cosgrove and Perkins (2014).

Achievement and Disadvantage

The School Support Programme (SSP) under DEIS (Delivering Equality of Opportunity in Schools – DES, 2005) comprises a set of measures that provide additional human and material resources to tackle the effects of educational disadvantage in schools with the highest assessed levels. Urban schools in SSP are allocated to either Band 1 or Band 2, depending on the level of disadvantage, while there is a separate set of measures for rural schools. DEIS was introduced in September 2006.

Although national assessments typically include some schools in SSP under DEIS, their representation is typically similar to their representation in the population. A consequence of this is that there is usually an insufficient number of such schools to monitor their progress in a systematic way. In particular, the standard errors around estimates of performance such as mean scores and percentages tend to be large, meaning that changes in performance can be difficult to detect. Nevertheless, national assessments can provide broad indicators of the performance of pupils in DEIS schools. In NA ’09, for example, it was found that pupils in DEIS Band 1 schools at both Second and Sixth classes achieved mean scores on English reading and mathematics that were about one standard deviation (50 points) below the corresponding scores of pupils in urban schools not in DEIS.

The Educational Research Centre has also monitored the progress of pupils in primary schools in DEIS by conducting a series of surveys between 2007 and 2013. These involved larger, more representative samples of schools and pupils in DEIS schools than are found in national assessments. In 2007, almost 13,000 pupils in Second, Third and Sixth classes in 120 DEIS Urban Band 1 and 2 schools were assessed on English reading and mathematics, while in both 2010 and 2013, over 17,000 pupils in Second, Third, Fifth and Sixth classes in a similar number of schools were assessed. The structure of the evaluation allowed for a

comparison of performance between pupils at the same grade level over time (e.g., Second class in 2007, 2010 and 2013) and in the same cohort at different class levels (e.g., pupils in Third class in 2010, the same pupils in Sixth class in 2013). Reading was assessed using the *Drumcondra Sentence Reading Test* (a test reserved for research purposes), while mathematics was assessed using a shortened version of the *Drumcondra Primary Mathematics Test – Revised*. Performance on reading literacy and mathematics in rural schools in DEIS was also assessed in Third and Sixth classes in 2007 and 2010, but not 2013 (see Weir & McAvinue, 2013).

In English reading, performance (number of items answered correctly) in DEIS Band 1 and 2 schools increased significantly over time at all four grade levels tested, and all increases in performance were statistically significant (Weir & Denner, 2013). For example, at the Third class level, the raw score for pupils in DEIS Band 1 schools in 2007 was 21.6 (out of 40). This increased to 23.3 in 2007 and to 25.5 in 2010. However, in 2013, pupils in Third class in DEIS Band 1 schools still lagged behind the national norm (a mean raw score of 29). Hence, while gains were statistically significant, they were small and did not lead to a substantive closing of the gap with the norm group. Improvements in performance in DEIS Band 2 schools tended to be smaller, as such schools started from a higher base in 2007. It is noteworthy that that between 3-8 percent of Band 1 and 2 schools showed decreases in performance between 2007 and 2010, and again between 2010 and 2013, while between 41% and 53% showed a mixture of increase and decreases, indicating that progression towards higher levels of performance is not always linear.

Increases in performance on reading literacy were also observed for pupils in the longitudinal component of the evaluation. For example, pupils in Third class in 2010 in Band 1 and 2 schools achieved a mean scale score of 92.3 (on a scale with a national mean of 100, and a standard deviation of 15), while the same pupils achieved a mean score of 93.8 in Sixth class in 2013. Although the difference was statistically significant, it was small, and these pupils still lagged well behind the national norm (mean = 100 score points) in Sixth class.

Like reading, performance in mathematics increased significantly over time. For example, pupils in Third class in DEIS Band 1 schools in 2007 achieved a mean raw score of 10.1 (out of 25). This increased to 11.2 in 2007, and 13.3 in 2013. Although differences were statistically significant, pupils in Third class in 2013 still lagged behind the norm group, which had a mean raw score of 18.0. Pupils who were retested across class levels also showed improved performance. For example, pupils in Third class in Band 1 and 2 schools in 2010 achieved a mean scale score of 93.4, and the same pupils achieved a mean score of 94.1 in Sixth class in 2013. Again, although the difference was statistically significant, these pupils continued to lag behind the norm group (mean = 100).

Another important finding in Weir and Denner's study was a drop in the proportion of pupils performing at or below the 10th percentile, and a small increase in those scoring above the

90th percentile across grade levels. For example, at Third class level in English reading in DEIS Band 1 schools, 32% performed at or below the 10th percentile in 2007; 27% did so in 2010; and 20% did so in 2013, though this was still twice the national estimate of 10%. A smaller drop was observed on reading in DEIS Band 2 schools at Third class level (from 21% in 2007 to 14% in 2013). Increases observed in the proportions performing above the national 90th percentile benchmark varied by domain and grade level. For example, across DEIS Band 1 and 2 schools, there was an increase in the proportion in Third class performing above the 90th percentile in mathematics from 5% in 2007 to 7% in 2010 to 11% in 2013. On the other hand, the same proportion of Third class pupils (2%) performed above the 90th percentile on English reading in both 2007 and 2013.

In rural DEIS schools, small but statistically significant increases were observed in both reading literacy and mathematics at both Third and Sixth classes from 2007 to 2010 though pupils in such schools tended to have higher average scores than their counterparts in urban DEIS schools (Weir, 2011; Weir & McAvinue, 2013).

In their report, Weir and Denner (2013) raised the point that, while performance in DEIS schools may have risen significantly since the introduction of DEIS, performance may also have risen in schools in general since the introduction of the *National Strategy to Improve Literacy and Numeracy* in 2011 (see next section). The 2014 National Assessments are designed to monitor changes in overall reading and mathematics among pupils in general since 2009.

National Strategy to Improve Literacy and Numeracy

In July 2011, the Department of Education and Skills launched a strategy document, *Literacy and Numeracy for Learning and Life: The National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-20* (DES, 2011a). The Strategy document followed on from an earlier document, *Better Literacy and Numeracy for Children and Young People: A Draft Plan to Improve Literacy and Numeracy in Schools* (DES, 2010), which had been published in November, 2010, and preceded the launch of the PISA 2009 results. There was a period of public consultation between the publication of the Draft Plan and the National Strategy.

In the National Strategy document, it is noted that one in ten children in Irish schools have serious difficulties in reading or writing, and that the literacy skills of pupils in primary schools had not improved in over 30 years, "despite considerable investment in reducing teacher-pupil ratios, the introduction of learning support (formerly remedial) and resource teachers, the provision of better teaching materials and considerable reform" (DES, 2011a, p. 12). The Strategy also referred to a decline in performance on PISA, and reports of post-primary principals and teachers on pupils' lack of literacy skills, which was seen as a barrier to "accessing the post-primary curriculum and making a smooth transition into post-primary school" (p. 12). In relation to mathematics, the Strategy referred to poor uptake of Higher

Level mathematics in the Leaving Certificate Examination (then 16% of the Senior Cycle cohort), and a decline in performance in PISA 2009, where one in five students in Ireland "did not have sufficient mathematical skills to cope with every-day life" (p. 13). Underperformance among higher-achieving students in PISA was also noted.

The National Strategy put forward a broad range of reforms including:

- Establishment of challenging targets focused on the progress of every child and the improvement of the core skills of literacy and numeracy at all stages of the educational system
- Development of a clearer specification of what students are expected to learn in early childhood care and education (ECCE) settings and primary and post-primary schools, with a view to prioritising the learning of literacy and numeracy
- Improvement of the professional skills of those who teach in ECCE and school settings in the teaching of literacy and numeracy in the context of delivering learning activities, assessing and monitoring progress, and using assessment outcomes to inform the next steps for learners
- Enhancement of literacy and numeracy provision for pupils from socially, economically and educationally disadvantaged backgrounds
- Development of the capacity of school leadership to lead improvement in literacy and numeracy
- Provision of help for parents and communities in supporting their children's teaching and learning
- Raising public awareness of the role that the family, community, the education system, libraries and other bodies can play in promoting successful literacy and numeracy.

In relation to the National Assessments of English Reading and Mathematics, the Strategy set the following targets:

- Reduce the percentage of children performing at or below Level 1 (i.e. minimum level) in the National Assessments of English Reading and Mathematics by at least 5 percentage points at both Second and Sixth classes by 2020; and
- Increase the percentage of primary children performing at Level 3 or higher (i.e., the highest levels) in the National Assessments of English Reading and Mathematics by at least 5 percentage points at both Second and Sixth classes by 2020.

NA '14 can provide feedback on the progress that has been achieved to date in reaching these targets. Table 1.2 shows the actual percentages achieving each of the levels in NA '09 (see above), and the target percentages specified in the Strategy for 2020.

Table 1.2 – Percentages of pupils performing at or below Level 1, and at or above Level 3 on reading and mathematics in the 2009 National Assessments, and target percentages in the National Strategy to Improve Literacy and Numeracy 2011-20

	% at Level 1 or below	% at Level 3 or above
National Assessments (2009)	35	35
Strategy Target (2020)	30	40

It should be noted that many of the reforms outlined in the Strategy document, including the development of revised curricula in English and mathematics for primary schools based on learning outcomes and new approaches to classroom-based assessment, had not been implemented at the time NA '14 was administered in schools, while other initiatives such as lengthening the duration of the B. Ed. degree for primary teaching to four years with an increased focus on literacy and numeracy, had been implemented, but their effects will not become apparent for a number of years (students in the first B. Ed. cohort taking a four-year degree will not graduate from Colleges of Education until 2016). On the other hand, a number of school-based initiatives, such as increases in the allocation of time to literacy and numeracy, the establishment of school-level targets for literacy and numeracy in School Development/Improvement plans, the reporting of the results of individual pupils to their parents, and the reporting of aggregated standardised test results of pupils in the Second, Fourth and Sixth classes in primary schools to the Board of Management and the DES on an annual basis, have been implemented already (see, for example, DES, 2011b). Literacy and numeracy link teachers have been identified in primary and post-primary schools and CPD focusing on literacy and numeracy has been provided by the PDST.

Summary

The outcomes of PIRLS 2011 reading literacy confirm that reading literacy standards in Ireland are relatively high at primary level. Just five countries (including Northern Ireland) achieved significantly higher mean scores than Ireland. However, 15% of pupils in Ireland performed at or below the Low PIRLS reading benchmark, suggesting that these pupils may struggle with reading. In Hong Kong, the Russian Federation and Finland, fewer than 10% of pupils performed at this level. The 2014 National Assessments provide an opportunity to examine the performance of lower-achieving pupils in more detail, include factors associated with their performance, and strategies that are in place to improve performance.

Performance on TIMSS 2011 mathematics, also administered to pupils in Fourth class, was not as strong as in reading, with Ireland ranking 17th of 48 countries, and achieving a mean score that was significantly behind the mean scores of countries such as Singapore, Korea, Hong Kong-China and Northern Ireland. Ireland's performance in TIMSS suggests room for improvement, and this is consistent with PISA, where students in Ireland have typically performed at a level that is close to the OECD average. In TIMSS 2011, 23% of students performed at or below the Low benchmark, compared to fewer than 10% in the highest-

performing countries. Ireland also had relatively few high performers (those scoring at the Advanced TIMSS benchmark).

The performance of 15-year olds in Ireland on PISA 2009 reading literacy and mathematics was disappointing. However, as noted at the time, there was no corroborating evidence of large declines in performance (such as lower performance on State examinations), and it is likely that the observed declines were due to a combination of factors, including reduced engagement with the assessment by some students, when compared with earlier cycles. The outcomes of PISA 2012 appear to confirm that performance on PISA 2009 was a once-off occurrence. In PISA 2012, students in Ireland performed above the OECD average in both reading literacy and mathematics, though performance on the Space and Shape component of PISA mathematics was particularly weak.

Studies in schools in the SSP under DEIS conducted in 2007, 2010 and 2013 point to small but significant improvements in performance in reading literacy and mathematics in urban DEIS schools, while studies conducted in 2007 and 2010 point to similar improvements in rural DEIS schools. There have also been reductions in the proportions of students performing at or below the 10^{th} percentile. However, it has been unclear up to now whether those improvements have led to a reduction in the performance gap between pupils in DEIS and non-DEIS schools, or if they mirror general increases in performance across the educational system. The 2014 National Assessments provide an opportunity to compare performance between schools in the SSP under DEIS with schools outside the programme.

Gender differences in earlier national and international studies at primary level have been small. In NA ’09, girls had a significantly higher overall reading score than boys at Second class, but not at Sixth. Overall differences on reading at Second, and mathematics at Second and Sixth classes were not statistically significant. Where significant differences on subscales were observed, they tended to be small and favoured girls in reading literacy and boys in mathematics. In PIRLS 2011 at Grade 4 in Ireland, there were significant difference in favour of girls on the overall reading literacy scale as well as on literary and informational text subscales, while in TIMSS 2011, differences between boys and girls in Ireland on overall mathematics and on the content and process subscales were not statistically significant.

The National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020 set out specific national targets linked to the national assessments of English reading and mathematics that should be achieved by 2020. The 2014 National Assessments provide an opportunity to gauge progress towards the achievement of those targets.

Chapter 2: Assessment Frameworks and Methodology

This chapter describes the assessment frameworks and methods used in the 2014 National Assessments of English Reading and Mathematics (NA ’14). The chapter consists of five main sections. First, the framework underpinning the English reading assessment is briefly outlined. Second, a short description of the mathematics assessment framework is given. Third, the pilot study conducted in 2013 is described. The fourth section outlines the sample design of the main assessment, gives a brief overview of its administration, and provides response rates for the English reading and maths tests. Finally, a description is provided of the methodologies used for the weighting, scoring, and scaling of the data.

Reading Framework

The reading assessment framework for NA ’14 is the same as that used in the 2009 National Assessments of English Reading and Mathematics (NA ’09) and the 2010 National Assessments of English Reading and Mathematics in Irish-medium Primary Schools (NAIMS; Gilleece et al., 2012). While a brief overview is provided here, a more detailed description of the framework, and of the test development process, can be found in ERC (2008) and in Eivers et al. (2010).

Reading in the National Assessments is defined as:

> the process of constructing meaning through the dynamic interaction among the reader’s existing knowledge, the information suggested by the written language, and the context of the reading situation. Young readers read to learn, to participate in communities of readers, and for enjoyment (Eivers et al., 2010, p.15).

The reading framework emphasises reading comprehension and, as such, the majority of items on the test instruments assess reading comprehension. The framework distinguishes between two main dimensions of reading comprehension: the purpose of the text (reading either for literary experience or to acquire and use information), and the process used to comprehend it (Retrieve, Infer, Interpret & Integrate, Examine & Evaluate). In NA ’14, as in NA ’09, roughly one half of the texts at each class level involved reading for literary experience and half involved reading for the acquisition and use of information. The processes used by pupils when reading can be inferred from the Primary School English Curriculum (PSEC; DES/NCCA, 1999a, 1999b), and are defined in Table 2.1.

Table 2.1: Processes of reading comprehension, and related examples, NA ’09 and NA ’14

Process	Examples
Retrieve requires the reader to read a text, and to understand how what is stated in the text relates to the information that is sought.	Look for specific information, events, ideas, definitions or phrases; identify the setting of a story; find the main theme of a text when explicitly stated.
Infer requires the reader to make inferences about how pieces of information relate to each other. The nature of the relationship is not explicitly stated in the text, but the inferences are usually simple, and based on explicitly-stated information.	Deduce or infer that one event caused another; determine the main point of a series of arguments; identify generalisations in a text; describe the relationships between two characters.
Interpret & integrate requires a more holistic understanding of the text, beyond the level of sentence. Some integration of personal knowledge or experience with text content may be required.	Discern the overall message or theme of a text; consider an alternative to actions of characters; compare and contrast text information; infer the mood or tone of a story; apply text information to a real world situation.
Examine & evaluate involves evaluation of a text, either from a personal perspective or a more critical and objective viewpoint. Emphasis changes from understanding the text to critiquing it.	Evaluate the plausibility of what the text describes; identify and comment on the structure and organisation of texts; judge the completeness or clarity of information in a text; identify or comment on the writer’s purposes and viewpoints.

At the Second class level, when reading, pupils are expected to be able to retrieve information, make inferences and, to an extent, interpret and integrate information. As pupils at this level will have had limited experience of evaluating texts, no Examine & Evaluate items are included in the Second class reading test (see Table 2.2 for the distribution of items assessing different reading processes in the Second class test materials[7]). All items included in the Second class tests are multiple-choice in format. By Sixth class, in addition to being expected to retrieve, infer, and interpret, pupils are also expected to be able to evaluate that which they read. Therefore, the Sixth class reading tests included Retrieve, Infer, Interpret & Integrate, and Examine & Evaluate items (see Table 2.3 for the numbers of items assessing each process). At Sixth class, approximately two thirds of the comprehension items are multiple-choice items, while one third are constructed-response (i.e. open-ended and requiring a written response).

Although the emphasis of the framework (and therefore of the test materials) is on reading comprehension, it is also acknowledged that core reading skills, such as decoding and processing word and sentence meanings, form an important part of a reading assessment. As such, a set of vocabulary items is included in the reading tests at both Second and Sixth classes. In addition to assessing understanding of word meanings, the vocabulary items are used at each class level to establish links across multiple forms of the tests.

[7] While the item pools for reading comprise 153 and 192 items at Second and Sixth classes, respectively, each individual pupil booklet comprised a subset of items.

Table 2.2: Numbers of items for reading tests, by component, purpose, and process, NA ’09 and NA ’14, Second class[8]

		Purposes					
		Literary		Informational		Total	
Component	**Processes**	**09**	**14**	**09**	**14**	**09**	**14**
Comprehension	Retrieve information	26	24	45	44	71	68
	Make inferences	25	29	16	14	41	43
	Interpret & integrate	17	15	4	7	21	22
	Examine & evaluate	—	—	—	—	—	—
Vocabulary	Core reading skills	—	—	—	—	20	20
Test Total		68	68	65	65	153	153

Table 2.3: Numbers of items for reading tests, by component, purpose and process, NA ’09 and NA ’14, Sixth class

		Purposes					
		Literary		Informational		Total	
Component	**Processes**	**09**	**14**	**09**	**14**	**09**	**14**
Comprehension	Retrieve information	35	33	48	48	83	81
	Make inferences	33	33	19	19	52	52
	Interpret & integrate	21	23	8	8	29	31
	Examine & evaluate	5	5	3	3	8	8
Vocabulary	Core reading skills	—	—	—	—	20	20
Test Total		94	94	78	78	192	192

Examples of items used to assess reading literacy in NA ’14 can be found at www.erc.ie/na2014.

Mathematics Framework

The mathematics assessment framework used in NA ’14 is also the same as that used in NA ’09, and a more detailed account of the framework and how it was used to guide test development can be found in ERC (2009) and in Eivers et al. (2010). The mathematics framework drew directly on the definition of mathematics in the Primary School Mathematics Curriculum (PSMC; DES/NCCA, 1999b), which sees mathematics as:

> …the science of magnitude, number, shape, space, and their relationships and also as a universal language based on symbols and diagrams. It involves the handling (arrangement, analysis, manipulation and communication) of information, the making of predictions and the solving of problems through the use of language that is both concise and accurate. (DES/NCCA, 1999, p.2).

[8] The data for NA ’14 in this table, and in Tables 2.3 to 2.7, reflect changes made to the NA ’09 tests following a field trial conducted in spring 2013, in preparation for the NA ’14 (see the section on Pilot Study in this chapter).

The PSMC contains instructional objectives for each class level (59 at Second class, 78 at Sixth) which are formed from a combination of two main dimensions: mathematical content strands and cognitive process skills. The content strands of the PSMC are Number, Algebra[9], Shape & Space, Measures, and Data. The cognitive process skills are Understanding & Recalling, Implementing, Reasoning, Connecting & Integrating, Applying & Problem Solving, and Communicating & Expressing. Each test item is classified by content strand and process skill. Items assessing the Communicating & Expressing skill could not be included in the National Assessments, given the pencil-and-paper format of the tests.

The NA '09 and NA '14 mathematics tests were designed so that the distributions of items assessing the content strands and cognitive processes closely approximated the distribution of these elements in the PSMC objectives (see Tables 2.4 and 2.5 for the distributions at Second class in NA '09 and in NA '14, and Tables 2.6 and 2.7 for the distributions at Sixth). It should be noted that the item pool for Data is rather small, so particular care should be exercised in drawing inferences about performance on Data, especially at Second class level.

Table 2.4: Classification of final maths items by content strand, Second class

	NA '09		NA '14		
	N of items	% of items	N of items	% of items	% PSMC Objectives
Number / Algebra	44	44	44	44	41.0
Shape & Space	16	16	16	16	22.0
Measures	34	34	34	34	34.0
Data	6	6	6	6	3.0
Total	100	100	100	100	100.0

Table 2.5: Classification of final maths items by process skill, Second class

	NA '09		NA '14	
	N of items	% of items	N of items	% of items
Understand & Recall	11	11.0	11	11.0
Implement	17	17.0	17	17.0
Integrate & Connect	16	16.0	16	16.0
Reason	28	28.0	28	28.0
Apply & Problem-Solve	28	28.0	28	28.0
Total	100	100.0	100	100.0

[9] Number and Algebra are combined in the framework as there were insufficient numbers of Algebra items to allow Algebra to be scaled separately from Number.

Table 2.6: Classification of final maths items by content strand, Sixth class

	NA '09		NA '14		
	N of items	% of items	N of items	% of items	% PSMC Objectives
Number / Algebra	69	46.0	69	46.0	43.0
Shape & Space	32	21.3	32	21.3	21.0
Measures	31	20.7	31	20.7	24.0
Data	18	12.0	18	12.0	12.0
Total	150	100.0	150	100.0	100.0

Table 2.7: Classification of final maths items by process skill, Sixth class

	NA '09		NA '14	
	N of items	% of items	N of items	% of items
Understand & Recall	15	10.0	15	10.0
Implement	30	20.0	30	20.0
Integrate & Connect	8	5.3	8	5.3
Reason	47	31.3	47	31.3
Apply & Problem-Solve	50	33.3	50	33.3
Total	150	100.0	150	100.0

At the Second class level, the mathematics test in both NA '09 and NA '14 consisted of five sections (blocks), each containing 20 items, which were distributed over four test booklets of three blocks each. The middle block in each booklet was common, and each of the remaining blocks appeared once each in the first and last positions. For all pupils in Sixth class in NA '09, and most pupils in NA '14, six blocks of 25 items each were distributed over six test booklets, with the middle block in each booklet common.

During the administration of NA '09, some concern was expressed by a number of class teachers over the length of the Sixth class maths test (130 minutes in duration, compared to 90 minutes at Second class maths, and 90 minutes for reading at both grade levels), and questions were raised about whether the test was unduly burdensome on pupils. In response to this feedback, NA '14 was used as an opportunity to explore the feasibility of reducing the length of the Sixth class test booklets in future national assessments. To this end, shortened versions of the mathematics test forms were administered to pupils in a random set of 20% of participating schools that had Sixth class pupils. Five versions of the experimental, shortened booklets were administered. Each test booklet contained two sections, with a common block in the second position and one of each of the remaining blocks in the first position. The schools in which pupils were to receive the shortened test booklets were randomly selected from all participating English-medium schools that had a Sixth class. Pupils who received the shortened test booklets had a mean scale score that was 4 points higher than pupils who took the regular-length test. For the purposes of this report,

which looks at trends in achievement from NA '09 to NA '14, the scores for pupils taking the experimental booklet were excluded from the analysis.[10]

Pilot Study

As mentioned earlier, a pilot study for NA '14 was conducted in May 2013. One of the principal aims of the pilot was to select reading passages and items, and mathematics items, to replace those which were retired from test booklets and released into the public domain following NA '09 (for examples of these passages and items, see www.erc.ie/na2009). In English reading, at Second class, eight reading passages and 90 items (distributed over two test booklets) were piloted. At Sixth class, eight passages and 96 items (also distributed over two test booklets), were piloted. Two mathematics booklets containing a total of 54 items were piloted with Second class pupils, while two maths booklets containing a total of 55 items were administered to Sixth class pupils. The pilot test booklets were administered to a sample of Second class and Sixth class pupils in 20 vertical schools. The sample of schools was randomly selected from a convenience subset of schools (i.e. only schools in Dublin, Cork, Galway, Limerick and Waterford, with both Second and Sixth classes, which were not participating in any other ERC studies, that had English as the primary language of instruction).

In NA '14, two reading passages and associated items were replaced at each class level with new texts and questions from the pilot study. Replacement texts were selected on the basis of their similarity to retired passages, both in terms of text purpose (i.e. literary or informative), and in terms of item difficulty level and discrimination. In addition to the 16 items accompanying the replacement passages at Second class, and the 16 items associated with replacement Sixth class passages, one further item, relating to a retained passage, was amended at Second class, and two items at Sixth class were amended/replaced, having been identified as problematic during NA '09, or subsequently. These were viewed as new items in NA '14. At Second class, 13 mathematics items were replaced, while at Sixth class, 16 items were replaced. Replacement items were selected from the available pool of piloted items based on their similarity to retired items, both in terms of the content area and process skill assessed by the item, and item characteristics such as difficulty and discrimination.

Main Study Sample Design and Administration

The sample for NA '14 was selected in two stages; first, schools were selected; then intact classes were selected within these schools. The target population consisted of all Second and Sixth class pupils in mainstream classes in primary schools in Ireland in May 2014. Private schools and special schools were excluded. To ensure that a representative sample was selected, the remaining schools were stratified (categorised) according to enrolment

[10] The sample of pupils and schools was sufficiently large to allow for the exclusion of these pupils.

size, SSP/DEIS status, area/language of instruction (Gaeltacht school, Gaelscoil, Ordinary School), and proportion of female pupils. In total, 130 vertical schools, 10 junior schools and 10 senior schools were selected. All 150 originally selected schools participated in the study.

The second stage of selection was at the class level. Participating schools supplied the ERC with details of their Second and Sixth classes, excluding special classes. For each school, ERC staff randomly selected up to two intact classes at each grade level. In practice, this meant that in small- and medium-sized schools, all pupils at the target grade level were selected. Pupils could be excluded at this stage if their teacher felt that it was appropriate to do so. The main reasons for exclusion were limited proficiency in English, or certain learning and physical disabilities. However, it was emphasised to inspectors, principal teachers, and class teachers that exclusions should be rare.

Testing took place between May 6th and May 23rd, 2014. Sixty-five current and retired DES inspectors were assigned to participating schools in order to assist with the administration of the tests, and to act as quality monitors. Prior to testing, inspectors were briefed as to the aims and procedures of the assessments. Inspectors arranged test dates directly with principals of their assigned schools. For test security purposes, test materials were delivered to inspectors shortly before the testing window, rather than being sent directly to schools.

Testing was conducted over two mornings in each participating school. English reading was administered first in half of schools, and mathematics first in the other half. At Second class, the mathematics test items were read aloud by class teachers, in order to minimise the effects of pupils' reading ability on their test performance. As such, all pupils in a given Second class received the same version of the mathematics test. For Sixth class mathematics, and for reading at Second and Sixth class, pupils were randomly assigned different test booklets.

In Irish-medium schools, bilingual maths test booklets were administered. At Second class, all pupils took the test in the same language (as all test items were read aloud). The decision as to whether the tests would be administered in Irish or English was taken at the school level. At Sixth class, the decision to take the maths test in Irish or English was made by individual pupils.

Response Rates

Response rates for the reading and mathematics tests were high. Table 2.8 shows the response rates for Second and Sixth class for NA '09, while Table 2.9 shows the response rates for NA '14. For NA '14, around one percent of pupils were exempted. A further five to six percent were absent on the testing day. The percentage of pupils absent on the day of testing was lower for NA '14 than for NA '09. Test data were collected for 94% of selected pupils for reading or mathematics in Second class and for 93% of selected pupils for reading or mathematics in Sixth class for NA '14.

Table 2.8: Response rates for the National Assessments, main study, 2009

	2nd class Reading (N=4199)		2nd class Mathematics (N=4199)		6th class Reading (N=4189)		6th class Mathematics (N=4189)	
	N	%	N	%	N	%	N	%
Exempt	53	1	43	1	45	1	38	1
Absent	307	7	251	6	341	8	319	8
Returned	3839	91	3905	93	3803	91	3832	91

Table 2.9: Response rates for the National Assessments, main study, 2014

	2nd class Reading (N=4370)		2nd class Mathematics (N=4370)		6th class Reading (N=4470)		6th class Mathematics (N=4470)	
	N	%	N	%	N	%	N	%
Exempt	48	1	35	1	40	1	41	1
Absent	223	5	207	5	264	6	285	6
Returned	4099	94	4128	94	4166	93	4144	93

Weighting, Scoring and Scaling of the Data

This section provides an overview of the purpose of, and processes involved in, weighting and scaling the test data. Readers interested in further details about the theory and methodologies underpinning the information presented here are referred to the NA '09 Technical Report (see www.erc.ie/NA2009).

Sampling Weights

Sampling weights were calculated prior to the analysis of the test data. Weights are necessary since schools (and therefore pupils) were sampled disproportionately with regard to their overall presence in the population. The weighting process also applies a correction to account for non-response (e.g., a pupil being absent on the day of testing). Weighting of data ensures that the contributions of certain groups of pupils (e.g. pupils attending large schools, or pupils who were present on the day of testing) are not over- or under-represented in the data and therefore do not bias findings. Sampling weights feed into the scaling of test data and the analysis and reporting of data from the questionnaires.

Scaling of Test Data

The data were scored and scaled using an IRT framework. IRT provides more adaptable and effective methods of test development, analysis, and scaling than those derived from classical test theory. It provides a difficulty estimate for each of the test items and an ability estimate for each of the pupils. Most importantly, the item difficulty and pupil ability estimates are on the same scale, and these estimates are not dependent on the ability levels

of different samples (having adjusted for any differences in the sample means and standard deviations). Because IRT treats items, or blocks of items, as interchangeable, new items, or blocks of items, can be added gradually.

As noted earlier, a feature of the test design was that pupils only saw a subset of the test items. The advantage of this approach is that a wider range of items can be used, thus improving the curriculum coverage and content validity, without overburdening pupils with very long tests. Comparability of results from pupils taking different test booklets was ensured firstly by the random assignment of booklets. Random assignment means that there should be no systematic differences between the ability levels of pupils taking any particular booklet. Secondly, all pupils within a grade level and domain were presented with a common set of items. In the case of reading, these were 20 vocabulary items presented at the beginning of the test. For mathematics there were 20 common items in Second class and 25 at Sixth class, which, as mentioned earlier, appeared as the second of three blocks in the case of the regular booklets, and second of two in the shortened, experimental booklets used at Sixth class only.

Mean percent correct scores and IRT scale scores were calculated for both domains at both class levels. As well as an overall test score, scores were created for the reading components (Vocabulary and Comprehension) and processes, and the mathematics content strands and process skills outlined above. NA ’09 was the first assessment in which the present National Assessment tests were administered. As baseline data, the NA ’09 results are the benchmark against which performance of pupils in NA ’14 is compared. In 2009, the IRT scale scores for each overall test and individual subscale were scaled to have a mean of 250 and a standard deviation of 50. So, for 2014 data, a mean score that is statistically significantly below 250 would indicate a fall in performance compared to the corresponding NA ’09 cohort, while a mean score statistically significantly above 250 would indicate an improvement in performance.

Summary

The assessment frameworks for NA ’09 were also used in NA ’14, while a number of items in the NA ’09 English reading and mathematics tests were replaced for NA ’14. Replacement items were selected on the basis of their similarity to retired items, following a pilot study carried out in 2013.

For NA ’14, a sample of 150 primary schools was selected to participate. All 150 schools which were initially selected participated. Response rates were high for both Second and Sixth class, in both English reading and maths (93%-94%). Very small numbers of pupils were exempted from participating by their class teachers (around 1% at each grade and in each domain). Tests were administered in participating schools on two days between the 6th and the 23rd of May, 2014, and test administration was overseen by current and former DES inspectors.

In scoring the data, the test scores of pupils in NA ’14 were placed on the same scales as used in NA ’09, allowing for direct comparison between NA ’09 and NA ’14 scores.

Chapter 3: Achievement Outcomes and Trends

This chapter describes the English reading and mathematics achievement of pupils who participated in NA ’14, and compares their performance with that of pupils who participated in NA ’09. The chapter consists of two main sections. First, reading performance (by grade level, overall, and by subscale) is reported. Next, mathematics performance (by grade level, overall, and by subscale) is outlined. In each section, reading and mathematics performance is also described in terms of proficiency levels, and considered in light of the 2020 targets set out in the *National Strategy to Improve Literacy and Numeracy*.

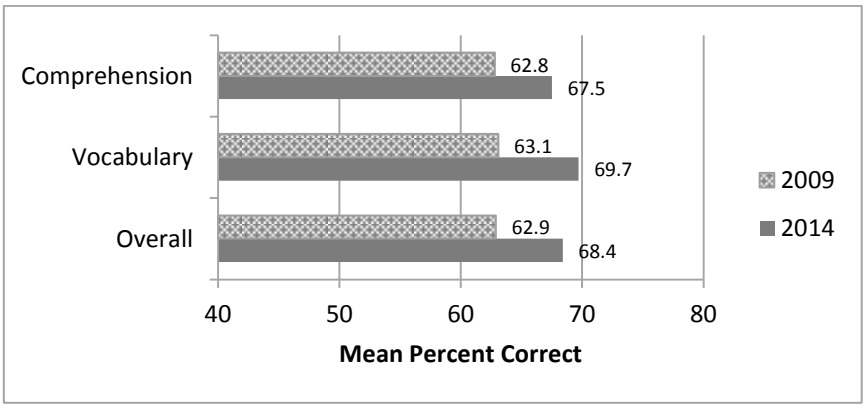
Comparisons between NA ’14 and NA ’09 outcomes are made throughout the chapter. As mentioned previously, the reading and mathematics tests used in NA ’14 were first administered in NA ’09. The NA ’09 scores (overall and subtest, for each domain, at each grade level) were scaled to have a mean of 250 and a standard deviation of 50. Pupil scores in NA ’14 were placed on the same scales used in NA ’09, allowing direct comparisons between NA ’09 and NA ’14 scale scores to be made (see Chapter 2).

English Reading

Second Class

Performance in reading can be examined with reference to two main subcomponents, Reading Vocabulary and Reading Comprehension, which, taken together, comprise pupils’ overall reading scores. In NA ’14, 70% of Vocabulary items and 68% of Comprehension items were answered correctly by Second class pupils. As can be seen from Figure 3.1, higher percentages of correct answers were generated on each of the reading scales in NA ’14 than in NA ’09, when 63% of items were answered correctly overall (63% of Vocabulary and 63% of Comprehension items).

Figure 3.1: Mean percent correct scores by reading content area and year, Second class



[11] Expansions of the tables and figures in this report can be found in the e-appendix (see www.erc.ie/na2014). These expanded tables provide full details of the percentages, scale scores and significance tests reported here. The e-appendix also contains some additional data tables.

Expressed as scale scores, the NA ’14 mean scores for the overall reading test, Vocabulary subtest, and Comprehension subtest were 264, 265 and 263, respectively, at the Second class level. As shown in Table 3.1, each of these mean scale scores is significantly higher than the equivalent NA ’09 mean score. Effect sizes range from .26 (Comprehension) to .30 (Vocabulary), and these can be considered substantively important. Scores on the Comprehension and Vocabulary subtests are strongly correlated (r=.77).

Table 3.1: Mean scale scores in English reading by component and year, Second class

	Second Class		
	NA ’09	**NA ’14**	***d***
Vocabulary	250	**265**	0.30
Comprehension	250	**263**	0.26
Overall	250	**264**	0.29

NA ’14 scores in bold are significantly different from the corresponding NA ’09 scores.

Pupil performance can also be described at different points along an achievement distribution. Table 3.2 displays scores of Second class pupils at key percentile ranks for the overall reading scale and for the Vocabulary and Comprehension subscales. For each scale, at all benchmarks, NA ’14 scores are significantly higher than their corresponding NA ’09 scores.

Table 3.2: Scores at key percentile markers on the overall reading, vocabulary and comprehension scales, by year, Second class

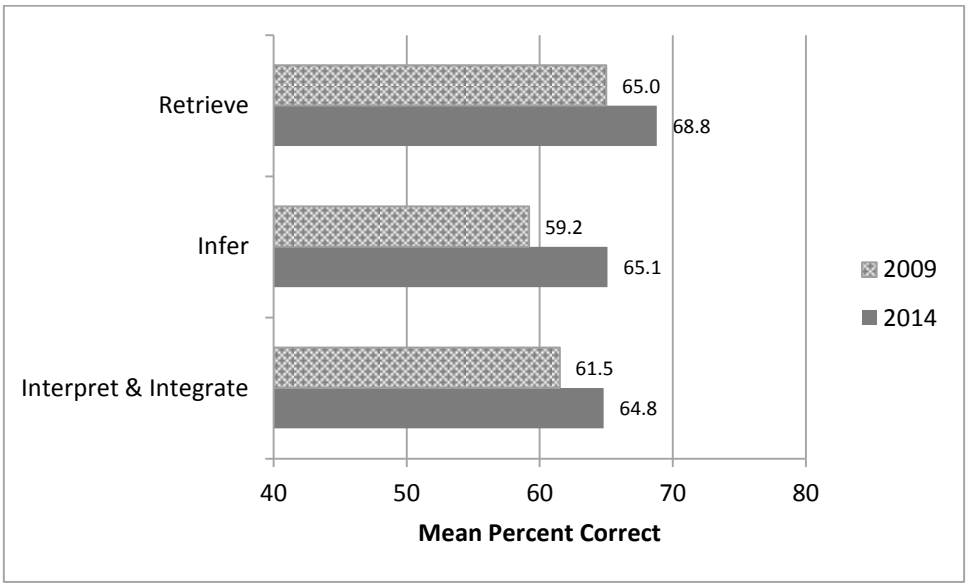
	Vocabulary		Comprehension		Overall	
Percentile	**NA ’09**	**NA ’14**	**NA ’09**	**NA ’14**	**NA ’09**	**NA ’14**
10th	187	**197**	185	**200**	186	**200**
25th	209	**229**	211	**229**	211	**230**
50th	247	**265**	247	**262**	247	**262**
75th	285	**299**	286	**296**	282	**297**
90th	319	**332**	317	**323**	319	**328**

NA ’14 scores in bold are significantly different from the corresponding NA ’09 scores.

Performance by Reading Process

Reading performance can also be categorised by subprocess. At the Second class level, three subprocesses (described in Chapter 2) were assessed: Retrieve, Infer, and Interpret & Integrate. As was found in NA ’09, items on the Retrieve subscale were somewhat easier than items on the other subscales, with 69% of items assessing the Retrieve process being answered correctly by Second class pupils in NA ’14. Items on the Infer and Interpret & Integrate scales were of similar difficulty, with 65% answered correctly. Mean percent correct scores are higher in NA ’14 than in NA ’09 across each of the process subscales (see Figure 3.2).

Figure 3.2 Mean percent correct scores by reading process skill and year, Second class



In line with the stronger overall reading performance in NA ’14 at the Second class level, Table 3.3 shows that pupils in NA ’14 significantly outperformed pupils in NA ’09 on all three of the reading processes assessed. For information on pupil performance at key markers (10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentiles) on the process skill subscales, please consult the e-appendix (Table E3.2).

Table 3.3: Mean scale scores in English reading by process and year, Second class

	Second Class		
Process	**NA ’09**	**NA ’14**	***d***
Retrieve	250	**261**	0.22
Infer	250	**263**	0.27
Interpret & Integrate	250	**261**	0.23

NA ’14 scores in bold are significantly different from the corresponding NA ’09 mean scores

Proficiency Levels

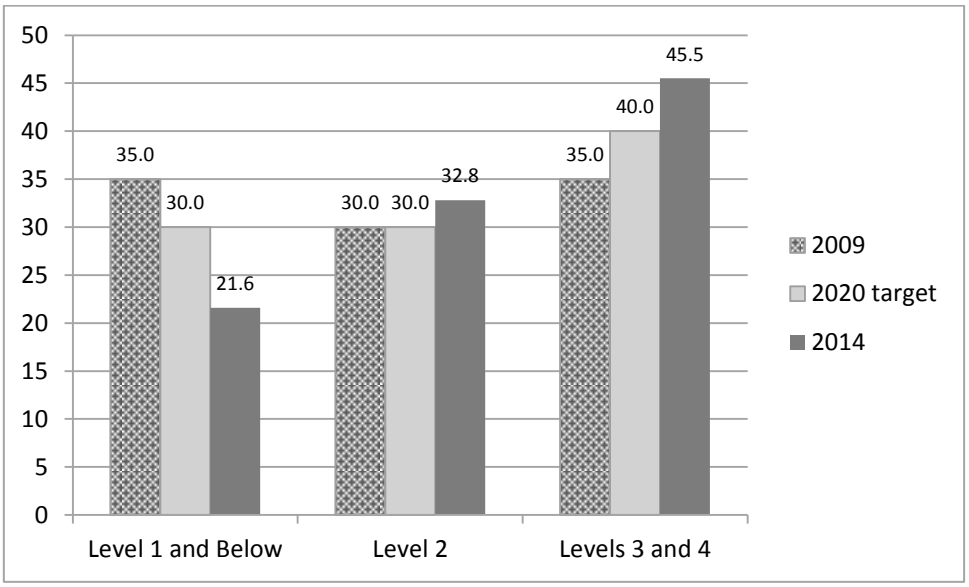
Pupil performance can also be described in terms of proficiency levels. Proficiency levels represent clusters of skill sets, and provide descriptions of the types of tasks which pupils at different levels of performance can consistently complete successfully. Pupils performing at Level 4 would be expected to complete the most complex tasks expected of their grade level, while those performing at Level 1 would be expected to be able to complete only the most basic tasks. Pupils who do not reach Level 1 are not consistently able to successfully display the reading skills assessed by the simplest items on the test. In the following sections, 2014 pupil performance in English reading and mathematics is reported on in terms of the proficiency scales that were developed for the 2009 National Assessments.

Table 3.4 describes the skills that Second class pupils at each reading proficiency level can be expected to demonstrate, and the percentages of pupils performing at each proficiency level in NA ’14 and NA ’09. Figure 3.3 shows the proportion of NA ’14 pupils performing at Level 1 or below, at Level 2, and at Level 3 or higher, relative to the performance of NA ’09 pupils and to the performance targets set out in the National Strategy (see Chapter 1). As this figure highlights, the 2020 target, to decrease the percentage of pupils performing at Level 1 or below by at least five percentage points, was met in NA ’14 (a 13 percentage point decrease). Similarly, the target to increase the percentage of pupils performing at Level 3 or above by at least five percentage points has also been met (an 11-point increase).

Table 3.4: Percentages of pupils at each proficiency level on the overall English reading scale, by year, Second class

Level & score range	What pupils can typically do	NA ’09	NA ’14
4 320+	As well as succeeding on lower proficiency level skills, pupils at Level 4 can retrieve complex information (e.g., the information needed is located in multiple parts of the text). They can link multiple pieces of information to draw inferences. They can integrate text-wide information in order to identify the main themes in a text. As well as using discrete or explicit information, they can use the text as a whole to interpret character behaviour.	10.0	13.5
319 3 269	As well as Level 1 and 2 skills, pupils can process texts at a whole-text level, in order to retrieve information. They can make basic-level inferences, sometimes linking one or two discrete pieces of information. They can infer word meanings if the context provides clear clues.	25.0	32.0
268 2 225	As well as Level 1 skills, pupils can retrieve explicitly stated information where the wording of the question and the text differ. However, the information sought must be specific to a small section of text. They can make low-level inferences, including character motives, if the required information is explicitly stated in a specific section of the text.	30.0	32.8
224 1 187	Level 1 pupils show basic reading skills. They can retrieve simple, explicitly stated, pieces of information, when there is a direct match between the wording of the question and the text. They are most successful on tasks that require comprehension of smaller units of text, such as sentences. They can perform some very basic interpretation and integration of text (e.g., identifying the theme of a text, where the theme is explicitly stated in the text).	25.0	16.5
<187 < 1	Pupils below proficiency Level 1 have a less than 62.5% chance of correctly answering a Level 1 question. Their reading skills are very low, relative to other 2nd class pupils and are not properly assessed by the National Assessment.	10.0	5.1

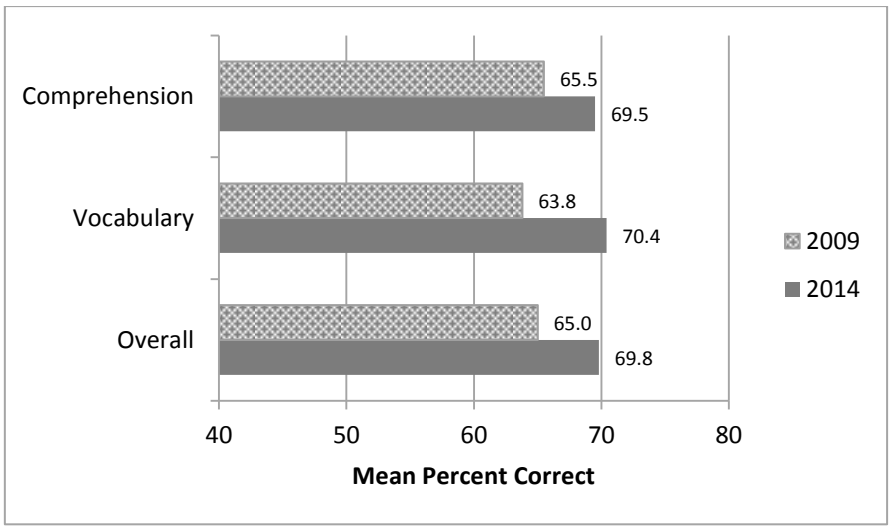
Figure 3.3: Percentages of Second class pupils achieving at various proficiency levels on the English reading scale, NA ’09, NA ’14, and 2020 targets



Sixth Class

At the Sixth class level, 70% of items on the reading test were answered correctly in NA ’14, including 70% of Vocabulary items and 70% of Comprehension items. As at Second class, the Vocabulary and Comprehension subscales are strongly correlated (r=.78). Higher percentages of items on each of the reading scales were answered correctly in NA ’14 than in NA ’09, as highlighted by Figure 3.4.

Figure 3.4 Mean percent correct scores by reading content area and year, Sixth class



Sixth class pupils in NA ’14 outperformed those who participated in NA ’09 by 13 scale score points overall, by 11 points on the Comprehension subscale, and by 15 points on the Vocabulary subscale. Each of these differences is statistically significant (see Table 3.5). Effect sizes range from small (Comprehension) to substantively important (overall reading, Vocabulary).

Table 3.5 Mean scale scores in English reading by content and year, Sixth class

	Sixth Class		
	NA ’09	**NA ’14**	***d***
Vocabulary	250	**265**	0.31
Comprehension	250	**261**	0.21
Overall	250	**263**	0.26

NA ’14 scores in bold are significantly different from the corresponding NA ’09 mean scores.

Table 3.6 displays scores of Sixth class pupils at key percentile ranks for the overall reading scale, and for the Comprehension and Vocabulary subscales. Each of the NA ’14 scores listed in the table is significantly higher than the corresponding NA ’09 score.

Table 3.6: Scores at key percentile markers on the overall reading, vocabulary and comprehension scales, by year, Sixth class

	Vocabulary		Comprehension		Overall	
Percentile	**NA ’09**	**NA ’14**	**NA ’09**	**NA ’14**	**NA ’09**	**NA ’14**
10th	182	**202**	183	**196**	183	**199**
25th	212	**231**	215	**227**	212	**229**
50th	250	**266**	250	**261**	250	**262**
75th	285	**299**	286	**294**	285	**297**
90th	300	**330**	315	**324**	316	**328**

NA ’14 scores in bold are significantly different from the corresponding NA ’09 mean scores.

Performance by Reading Process

At Sixth class, an additional subprocess, Examine & Evaluate, was assessed. In NA ’14, Examine & Evaluate items were the easiest, with 74% of these answered correctly. Of similar difficulty were items assessing the Retrieve subprocess, with 73% answered correctly. Somewhat more difficult were items on the Infer and Interpret & Integrate subscales, at 67% and 65%, respectively (see Figure 3.5). Table 3.7 shows that the NA ’14 mean scale scores for each of these reading processes are significantly higher than the equivalent NA ’09 scores, with differences ranging from five scale points (Examine & Evaluate) to 10 points (Retrieve and Infer).

Figure 3.5 Mean percent correct scores by reading process skill and year, Sixth class

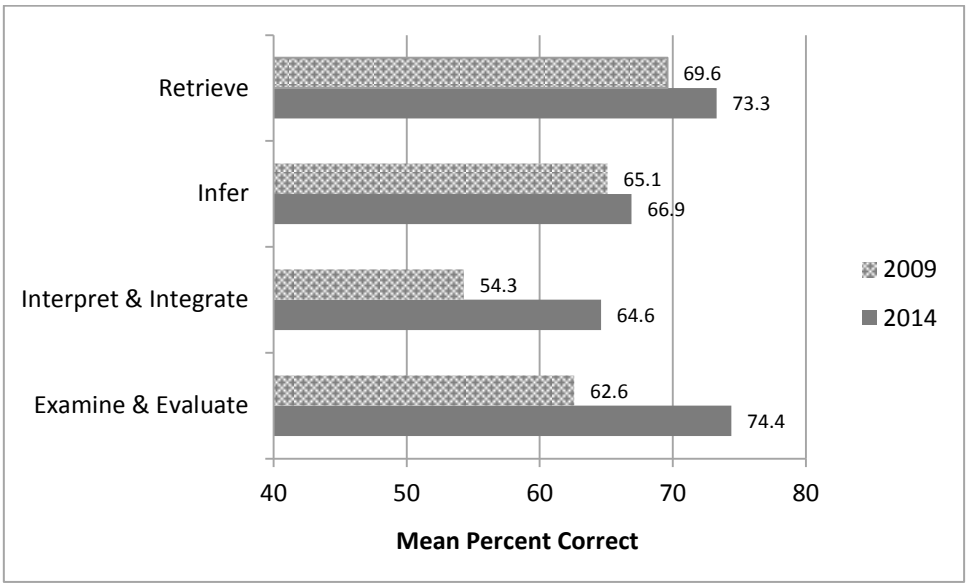


Table 3.7: Mean scale scores in English reading by process and year, Sixth class

	Sixth Class		*d*
Process	**NA '09**	**NA '14**	
Retrieve	250	**260**	0.20
Infer	250	**260**	0.20
Interpret & Integrate	250	**259**	0.18
Examine & Evaluate	250	**255**	0.10

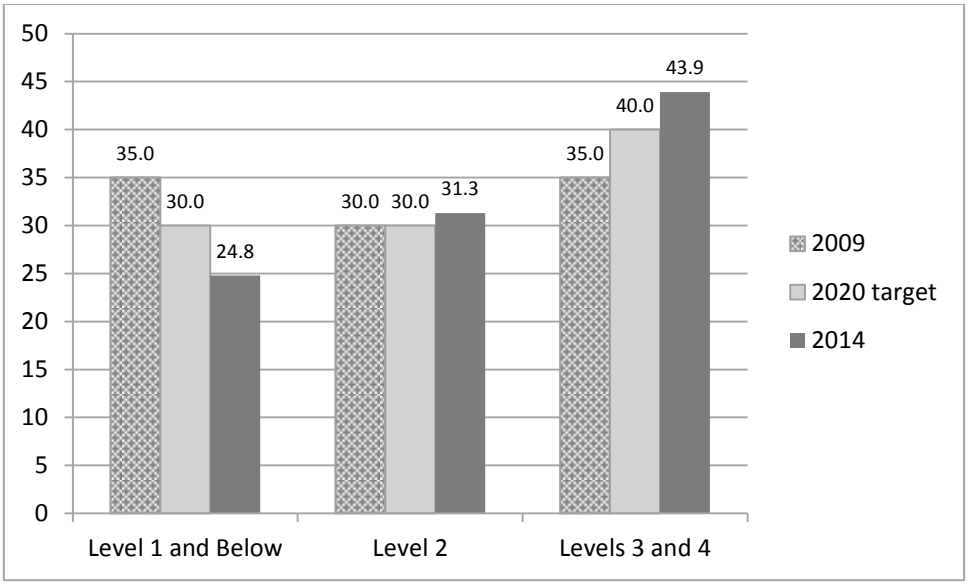
NA '14 scores in bold are significantly different from the corresponding NA '09 mean scores.

Table 3.8 summarises the English reading skills that Sixth class pupils at different proficiency levels are expected to display consistently, and provides the percentages of pupils performing at each level in NA '09 and NA '14. As can be seen from Table 3.8 and Figure 3.6, there are proportionally fewer Sixth class pupils with weak reading skills (a decrease of 10 percentage points among those performing at Level 1 or below) and more pupils with higher-level reading skills (an increase of 9 percentage points) in NA '14 than in NA '09. As at Second class, the 2020 National Strategy targets for performance at Level 1 and below, and at Level 3 and above, have both been met for Sixth class reading.

Table 3.8: Percentages of pupils at each proficiency level on the overall English reading scale, by year, Sixth class

Level & score range	What pupils can typically do	NA '09	NA '14
4 317+	As well as skills exemplifying lower levels, pupils at proficiency Level 4 show advanced retrieval skills. They can find answers where the phrasing of the text and question differ considerably. They do not need to rely on explicitly stated information or connections, but can infer answers from multiple pieces of text, and use broad themes at whole-text level to infer an answer. They can evaluate the rationale behind a piece of text, even where the text covers multiple events/topics, and the overall rationale is not apparent unless analysed at a global level.	10.0	14.3
316 **3** 271	As well as Levels 1 and 2 skills, pupils at Level 3 have complex retrieval skills. They can examine multiple elements of the text to locate the correct response and rule out incorrect responses. They can answer items where the phrasing in the text and question are not identical, and locate detail in dense texts such as advertisements or dictionaries. Pupils at Level 3 have more strongly established inferencing skills (e.g., they are consistently able to link two pieces of information from a text to infer the correct response). They can interpret meanings at whole-text level, and integrate this with personal knowledge or experience, in order to identify a correct response. They can use opinion and external knowledge to evaluate arguments made, the clarity of information presented, or the structure and "appeal" of texts.	25.0	29.6
270 **2** 230	Pupils at Level 2 can carry out multipart retrieval processes, such as answering questions that use a modified version of the phrasing in the text. They can also match question content with information in the stimulus text that extends beyond one or two adjacent sentences, provided that the question is an almost literal match with text content. They can combine two pieces of non-adjacent information in the text to infer a response, but their skills at this level are not consistent. They demonstrate integration skills such as identifying overall themes from texts, or drawing on outside knowledge.	30.0	31.3
229 **1** 183	Pupils at Level 1 can carry out basic retrieval processes and can match words and phrases in the question with the same words and phrases in the stimulus text to answer items. They can also make low-level inferences, where at least part of the information required for the answer is explicitly stated in the text, or where a discrete piece of explicitly stated text coupled with very basic external knowledge is sufficient to answer the question. Pupils at this level can also engage in some interpretation and integration of information, such as identifying an idea or theme in a section of text. They can identify the rationale behind a piece of text where it is clearly flagged (for example, in the title).	25.0	19.8
<183	Pupils below proficiency Level 1 have a less than 62.5% chance of correctly answering the easiest questions. Their reading skills are very low, relative to other 6th class pupils, and are not properly assessed by this assessment.	10.0	5.0

Figure 3.6: Percentages of Sixth class pupils achieving at various proficiency levels on the English reading scale, NA ’09, NA ’14 and 2020 targets



Correlations between Reading Process Subscales

At both Second and Sixth class levels, the strongest correlations are between the Retrieve and Infer subscales (from .74 to .76; see Table 3.9). The weakest correlations are between Examine & Evaluate (assessed only at Sixth class and with only eight items) and other subscales (less than 0.4 in all cases).

Table 3.9: Correlations between reading process scale scores, Second and Sixth class

	Retrieve	Infer	Interpret & Integrate	Examine & Evaluate
Retrieve	-	**.74**	**.63**	-
Infer	**.76**	-	**.65**	-
Interpret & Integrate	**.64**	**.62**	-	-
Examine & Evaluate	**.39**	**.36**	**.33**	-

Sixth class correlations are shaded. Correlation coefficients in bold indicate significant correlations. Examine & Evaluate was not assessed at the Second class level.

Mathematics

Second Class

At Second class, 62% of questions on the mathematics test were answered correctly in NA ’14, an increase from the corresponding NA ’09 figure of 57%. Pupils in NA ’14 outperformed pupils in NA ’09 by a margin of 14 scale score points – a statistically significant difference (see Table 3.11 below). The overall effect size (0.28) can be considered substantively important. Table 3.10 shows scores of Second class pupils at key markers on

the overall mathematics scale. At all of these specified points, scores in NA ’14 are significantly higher than in NA ’09.

Table 3.10: Scores at key percentile markers on the overall mathematics scale, by year, Second class

	Overall mathematics scale	
Percentile	**NA ’09**	**NA ’14**
10th	184	**200**
25th	215	**230**
50th	250	**265**
75th	286	**297**
90th	313	**324**

NA ’14 scores in bold are significantly different from the corresponding NA ’09 scores.

Performance by Mathematics Content Strand and Process Skill

Mathematics performance was examined by content area (Number & Algebra, Shape & Space, Measures, and Data) and by subprocess (Understand & Recall, Implement, Reason, Integrate & Connect, and Apply & Problem Solve). Shape & Space items were the easiest at Second class (69% correct). Measures items were the most difficult, with 55% answered correctly (see Figure 3.7).

Items assessing Apply & Problem Solve were the most difficult of those on the process sub-scales, with 54% answered correctly. Those relating to the Understand & Recall process were the easiest, with three quarters answered correctly by Second class pupils (see Figure 3.8).

Figure 3.7 Mean percent correct by mathematics content area and year, Second class

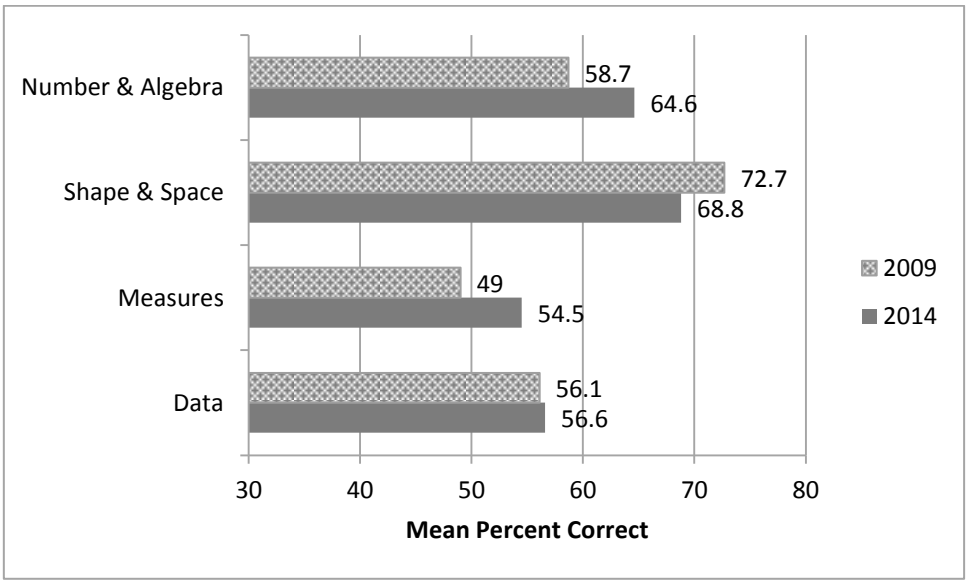
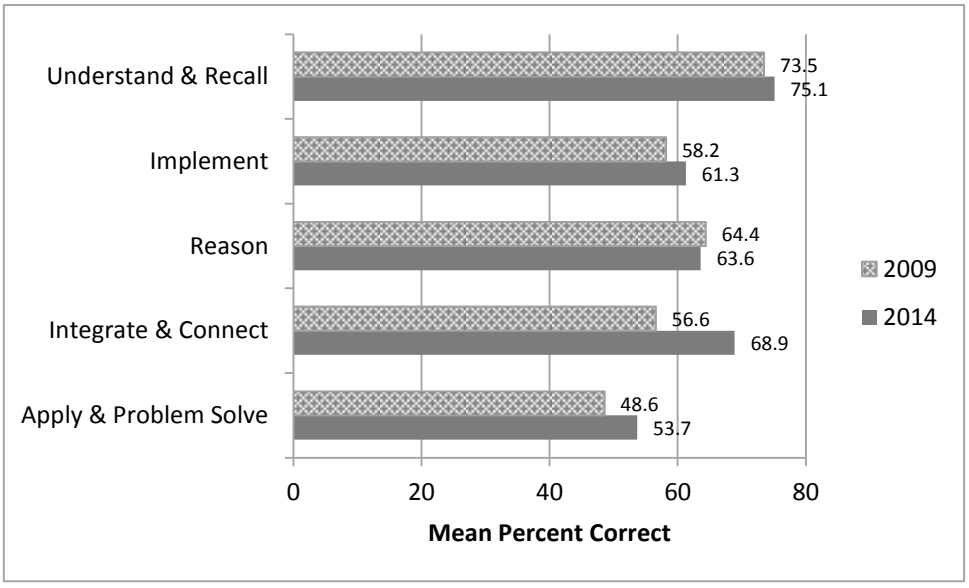


Figure 3.8 Mean percent correct scores by maths process skill and year, Second class



In NA ’14, Second class pupils significantly outperformed those in NA ’09 on three of the four content areas, and did not differ from pupils in NA ’09 on the fourth– Data (see Table 3.11). Pupils in NA ’14 also significantly outperformed NA ’09 pupils on all five of the process subscales assessed (see Table 3.12).

Table 3.11: Mean scale scores in mathematics by content strand and year, Second class

	Second class		
Content Area	**NA ’09**	**NA ’14**	***d***
Number & Algebra	250	**265**	0.31
Space & Shape	250	**259**	0.18
Measures	250	**262**	0.24
Data	250	254	0.09
Overall	250	**264**	0.28

NA ’14 scores in bold are significantly different from the corresponding NA ’09 mean scores

Table 3.12: Mean scale scores in mathematics by process and year, Second class

	Second class		
Process	**NA ’09**	**NA ’14**	***d***
Understand & Recall	250	**260**	0.21
Implement	250	**259**	0.17
Reason	250	**268**	0.35
Integrate & Connect	250	**259**	0.19
Apply & Problem Solve	250	**262**	0.24

NA ’14 scores in bold are significantly different from the corresponding NA ’09 mean scores.

Proficiency Levels

The mathematics skills which Second class pupils demonstrate at each proficiency level, and the percentages of pupils at each level in NA ’09 and NA ’14, are presented in Table 3.13. As shown in Figure 3.9, there are proportionally fewer pupils performing at or below Level 1 (a 9 percentage point decrease) in NA ’14 and more performing at or above Level 3 (a 12 percentage point increase) As such, the 2020 targets outlined in the National Strategy have been met for mathematics at Second class in NA ’14.

Figure 3.9: Percentages of Second class pupils achieving at various proficiency levels on the mathematics scale, NA ’09, NA ’14, and 2020 targets

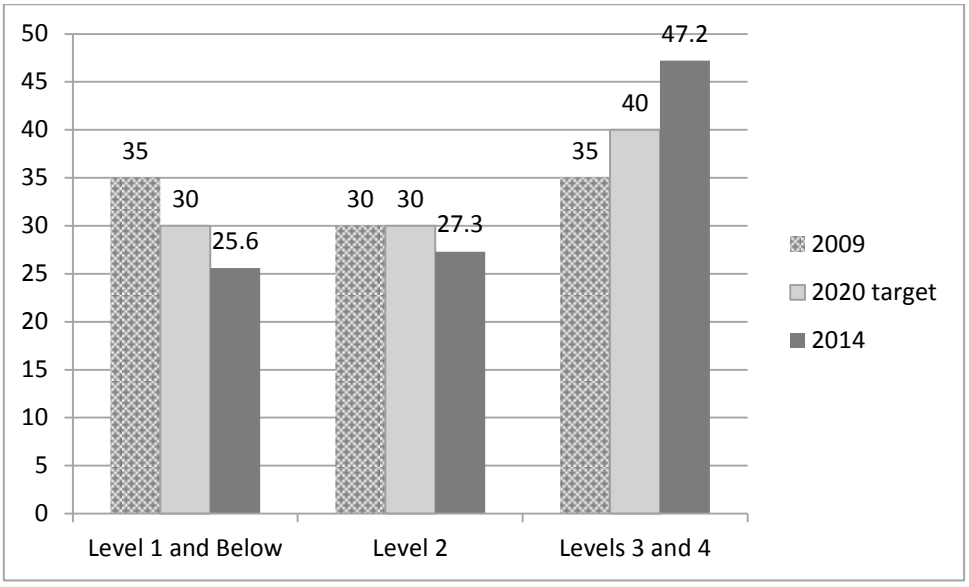


Table 3.13: Percentages of pupils at each proficiency level on the overall mathematics scale, by year, Second class

Level & score range	What pupils can typically do	NA '09	NA '14
4 **315+**	Pupils at Level 4 can calculate the cost of items which may be bought with a given sum of money, and can calculate the best estimate of the sum or difference of two two-digit numbers. They show understanding of the associative property of addition; the connection between two-step word problems and their corresponding numerical expressions; and the correct use of the symbols =, <, >. They can measure length using metres and centimetres and measure area using a non-standard unit. They can interpret information from a bar-line graph and make a calculation with it. They can solve one-step word problems involving: repeated addition; addition or subtraction of clock times; halves and quarters of metres, kg, and litres. They can solve two-step word problems involving addition and subtraction of two-digit numbers and money.	10	14.5
314 **3** **270**	Pupils at Level 3 can recall the subtraction facts, add a row of three numbers with renaming within 99, and find the difference between two two-digit numbers. They can use the vocabulary of ordinal number, and convert tens and units to numbers from 10 to 199. They can extend number patterns, identify quarters of 2-D shapes, and partition a 2-D shape into two other shapes. They can use the concept of an angle as a rotation, use a calendar to read days, dates, months and seasons, and select appropriate non-standard units for measuring capacity. They can exchange coins. They can also solve: one-step word problems involving: addition or subtraction of two-digit numbers; halves and quarter of sets of up to 20 objects; addition or subtraction of money, cm and m, kg or litres; time in hr and min on 12-hour clock. They can solve one-step and two-step word problems involving minutes, hours and days.	25	32.7
269 **2** **232**	Pupils at Level 2 can be expected to add columns of three numbers with renaming within 99. They can identify odd and even numbers. They can use the symbols +, - to complete number sentences. They can identify halves of sets with up to 20 objects. Pupils at this level can combine two 2-D shapes to make other shapes. They can identify properties of 3-D shapes and compare lengths of objects in non-standard units. Pupils at this level can convert analogue to digital time (to the half-hour), and interpret information in simple block graphs. They can solve one-step word problems involving addition or subtraction of simple whole numbers.	30	27.3
231 **1** **184**	Pupils at Level 1 can be expected to count objects in groups of threes and fives; use ordinal number; locate numbers within specified intervals up to 199; connect verbal and numerical forms of numbers, up to 199; and recall the addition facts. They can use the vocabulary of spatial relations to locate objects; identify and classify simple 2-D and 3-D shapes and list some of their properties. They can identify half of a regular 2-D shape. Pupils at this level can use the vocabulary of time to sequence events, and identify a date in a calendar. They can find the value of a group of coins. They can read a simple block graph.	25	19.4
<184	Pupils below proficiency level 1 have a less than 62.5% chance of correctly answering a Level 1 question. Their mathematical skills are very low, relative to other 2nd class pupils and are not properly assessed by the National Assessments.	10	6.2

Sixth Class

In NA ’14, 59% of items on the regular version of the Sixth class mathematics test were answered correctly, compared with 55% in NA ’09. Pupils in NA ’14 scored significantly higher than pupils in NA ’09 on the overall mathematics scale, outperforming them by 12 scale points (Table 3.15 below). The overall effect size (0.25) can be considered substantively important. Scores at the 10th, 25th, 50th, 75th and 90th percentiles are also significantly higher in NA ’14 than the corresponding NA ’09 scores at each of these benchmarks (Table 3.14).

Table 3.14: Scores at key percentile markers on the overall mathematics scale, by year, Sixth class

	Overall mathematics scale	
Percentile	**NA ’09**	**NA ’14**
10th	183	**198**
25th	214	**227**
50th	249	**261**
75th	286	**297**
90th	315	**326**

NA ’14 scores in bold are significantly different from the corresponding NA ’09 scores.

Performance by Mathematics Content Strand and Process Skill

As at Second class, four content strands and five processes were assessed at the Sixth class level. There was considerable variation in percent correct scores across content subscales, ranging from 42% of Measures items to 63% of Number & Algebra and 63% of Data items (see Figure 3.10). Mean scale scores for NA ’14 pupils were significantly higher than those of NA ’09 pupils for all content areas (see Table 3.15) and for all process subscales scores (see Table 3.16). As at Second class, items assessing the Apply & Problem Solve process were the most difficult, with just under half of these items being answered correctly by Sixth class pupils. Reason items were the easiest at Sixth class, with a mean percent correct score of 67% (see Figure 3.11).

Figure 3.10 Mean percent correct scores by maths content area and year, Sixth class

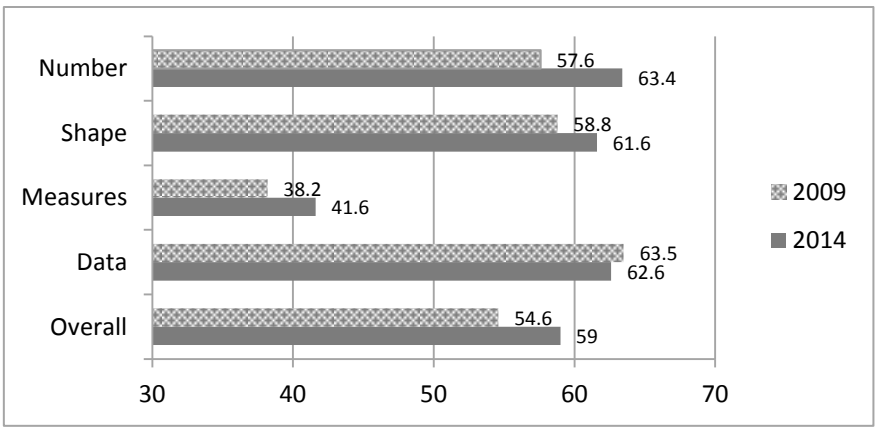


Table 3.15: Mean scale scores in mathematics by content strand and year, Sixth class

	Sixth class		
	NA '09	**NA '14**	***d***
Number & Algebra	250	**261**	0.22
Space & Shape	250	**263**	0.27
Measures	250	**259**	0.17
Data	250	**259**	0.18
Overall	250	**262**	0.24

NA '14 scores in bold are significantly different from the corresponding NA '09 scores.

Figure 3.11 Mean percent correct scores by maths process skill and year, Sixth class

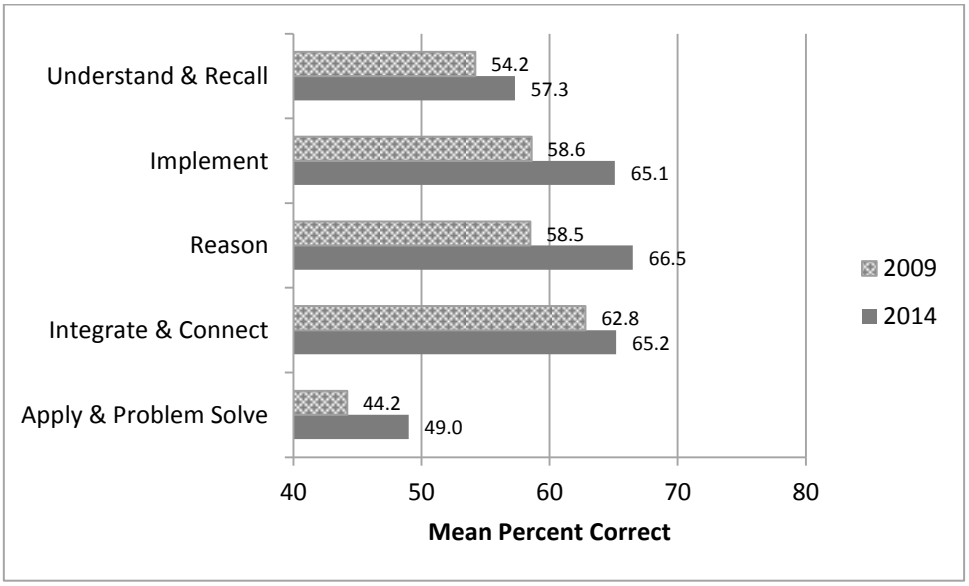


Table 3.16: Mean scale scores in mathematics by process and year, Sixth class

	Sixth class		
	NA '09	**NA '14**	***d***
Understand & Recall	250	**260**	0.21
Implement	250	**263**	0.26
Reason	250	**262**	0.23
Integrate & Connect	250	**257**	0.15
Apply & Problem Solve	250	**259**	0.19

NA '14 scores in bold are significantly different from the corresponding NA '09 mean scores.

Proficiency Levels

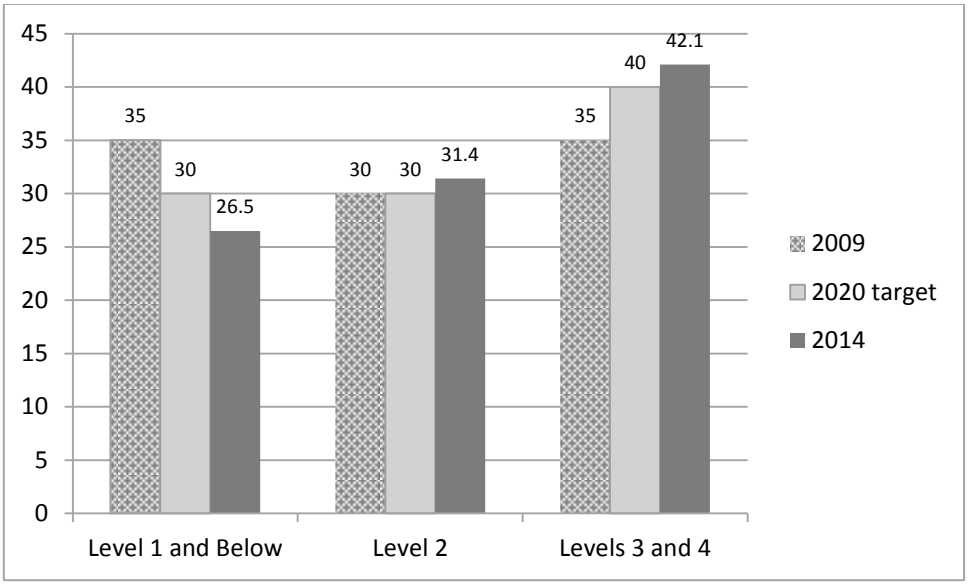
Table 3.17 outlines the mathematics skills which Sixth class pupils can demonstrate at each proficiency level, and the percentages of pupils performing at each level in NA '09 and NA '14. As can be seen from Figure 3.12, there are proportionally fewer Sixth class pupils performing at or below Level 1 (a 9 percentage point decrease) and more performing at or

above Level 3 (a 7-point increase) in NA ’14 than in NA ’09. As such, the 2020 targets outlined in the National Strategy have been met for mathematics at Sixth class in NA ’14.

Table 3.17: Percentages of pupils at each proficiency level on the overall mathematics scale by year, Sixth class

Level & score range	What pupils can typically do	NA ’09	NA ’14
4 **316+**	Pupils at Level 4 can multiply and divide decimals by decimals, and carry out simple algebraic procedures involving evaluation of linear expressions and one-step equations. They can demonstrate a high level of understanding of signed integers and number theory concepts such as prime and composite numbers. They can deduce symbolic rules for simple functions. At this level pupils can also analyse geometric shapes in detail and deduce rules about them. They can construct circles. They can plot coordinates and use scales on maps or plans to calculate distances and areas. They can solve non-routine and multi-step practical problems involving ratios, mixed numbers, percentage gain or loss, value for money comparisons, currency conversions, speed, and time zones.	10.0	14.9
315 **3** **273**	Pupils at Level 3 can add and subtract mixed numbers and decimals. They can demonstrate understanding of decimal notation, factors and multiples, exponents, and square roots. They can connect verbal and symbolic representations of word problems. They can construct and measure angles and construct triangles and rectangles given selected sides and angles. Pupils at this level can classify triangles and quadrilaterals based on angle and line properties and rules. They can identify properties of 3-D shapes. They can manipulate commonly used units of area, capacity and weight. They can read, interpret, and analyse pie-charts, multiple-bar bar-charts and trend graphs. They can estimate simple probabilities. They can solve routine and non-routine word problems involving operations with fractions, decimals and percentages, length and perimeter, capacity, and time.	25.0	27.2
272 **2** **230**	Pupils at Level 2 can multiply fractions and decimals, estimate products, calculate common factors and multiples of whole numbers, and convert fractions and decimals to percentages. They can identify prime numbers within 30 and identify rules for number patterns. They can demonstrate understanding of a letter as a placeholder in algebraic expressions, and complete two-step number sentences involving addition and subtraction. Pupils at this level can construct lines and circles, estimate angles and use properties of shapes to calculate line and angle sizes. They can make logical deductions from simple data sets. They can solve multi-step word problems involving operations with integers, fractions and percentages.	30.0	31.4
229 **1** **184**	Pupils at Level 1 can add, subtract, and round whole numbers and decimals. They show understanding of whole number notation and can connect numeric and verbal representations of large numbers. Pupils at this level can classify angles and identify templates of simple 3-D shapes. They can manipulate commonly used units of length. They can read and interpret, without calculation, simple frequency tables, pie-charts, bar charts and trend graphs. They can solve routine word problems involving the four operations with whole numbers.	25.0	20.9
<184	Pupils below proficiency Level 1 have a less than 62.5% chance of correctly answering a Level 1 question. Their mathematical skills are very low, relative to other 6th class pupils and are not properly assessed by the National Assessments.	10.0	5.6

Figure 3.12: Percentages of Sixth class pupils achieving various proficiency levels on the mathematics scale, NA ’09, NA ’14, and 2020 targets



Correlations between Mathematics Subscales

At both Second and Sixth class, the strongest correlations between content strand subscales are between Number & Algebra and Measures (slightly higher than .8 in both cases; see Table 3.18). Also, at both grade levels, the weakest correlations are between the Shape & Space and Data subscales (r=.40 at Second class and r=.63 at Sixth class).

Table 3.18: Correlations between mathematics content area subscales, Second and Sixth class

	Number & Algebra	Shape & Space	Measures	Data
Number & Algebra	-	**.66**	**.83**	**.48**
Shape & Space	**.74**	-	**.66**	**.40**
Measures	**.81**	**.70**	-	**.47**
Data	**.70**	**.63**	**.67**	-

Sixth class correlations are shaded. Correlation coefficients in bold indicate significant correlations.

At both grade levels, the strongest correlations between process subscales are between Reason and Apply & Problem Solve (r=.76 at Second class and .83 at Sixth; see Table 3.19). The weakest correlation at both grade levels is between the Recall and the Integrate & Connect subscales (r=.53 at Second class and r=.58 at Sixth class).

Table 3.19: Correlations between mathematics process scales, Second and Sixth class

	Understand & Recall	Implement	Reason	Integrate & Connect	Apply & Problem Solve
Understand & Recall	-	**.62**	**.64**	**.58**	**.65**
Implement	**.72**	-	**.70**	**.63**	**.73**
Reason	**.72**	**.77**	-	**.65**	**.76**
Integrate & Connect	**.53**	**.54**	**.60**	-	**.69**
Apply & Problem Solve	**.73**	**.79**	**.83**	**.58**	-

Sixth class correlations are shaded. Correlation coefficients in bold indicate significant correlations.

Summary

At each class level, and in each domain, NA'14 overall mean scores are significantly higher than the corresponding NA '09 scores. Additionally, all mean reading subscale scores for both Second and Sixth class are significantly higher in NA '14 than in NA '09. In mathematics, all mean subscale scores increased significantly from NA '09 to NA '14, with the exception of Data at Second class.

In terms of proficiency levels, the 2020 targets set out in the National Strategy to Improve Literacy and Numeracy were met in 2014 for both English reading and mathematics, at both the Second and Sixth class levels.

Overall effect sizes ranged from .24 (Maths, Sixth class) to .29 (Reading, Second class), and these can be interpreted as substantively important. It is noteworthy that they have been achieved in large-scale National Assessments and that improvements have been made at all levels of performance from the 10^{th} to the 90^{th} percentile ranks. It is also noteworthy that the improvements have been made in both English reading and maths, and at both Second and Sixth classes.

Chapter 4: Performance and Gender

This chapter consists of two main sections. First, English reading performance is outlined by grade level and gender, followed by an examination of mathematics performance along the same lines. Comparisons with NA ’09 achievement outcomes are made throughout.

English Reading

Second Class

Overall, in NA ’14, 70% of English reading items (70% of Vocabulary items and 70% of Comprehension items) were answered correctly by Second class girls, compared to 67% (69% Vocabulary and 66% Comprehension) by Second class boys (Figure 4.1). In NA ’09, 66% of all items (67% Vocabulary and 65% Comprehension) had been answered correctly by girls and 60% (61% Vocabulary and 59% Comprehension) by boys.

In terms of scale scores, in NA ’14, Second class girls scored significantly higher on the overall reading scale than Second class boys, outperforming them by a margin of 7 scale points. As shown in Table 4.1, girls significantly outperformed boys on the Comprehension subscale (a difference of 9 scale points), but did not perform significantly differently on the Vocabulary scale. In NA ’09, Second class girls significantly outperformed boys on the overall reading scale, the Vocabulary subscale, and the Comprehension subscale.

Boys’ and girls’ overall, Comprehension, and Vocabulary mean scores are significantly higher in NA ’14 than in NA ’09. In NA ’14, girls scored 11 scale points higher on the overall reading scale than girls in NA ’09, while boys in NA ’14 scored 17 scale points higher than their counterparts in NA ’09. Effect sizes for boys range from 0.32 (Comprehension) to 0.35 (Vocabulary), and these can be considered substantively important. Effect sizes for girls range from 0.19 (comprehension) to 0.25 (Vocabulary), with only Vocabulary reaching the 0.25 criterion for substantive importance.

Figure 4.1: Mean percent correct scores by reading component and gender, Second class (NA ’14)

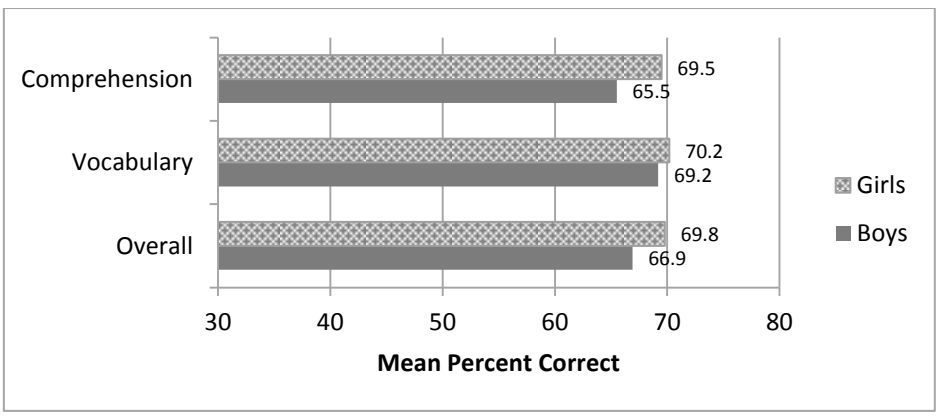


Table 4.1: Mean pupil achievement scores in English reading by component, year, and gender, Second class

	Boys			Girls		
	NA '09	NA '14	*d*	NA '09	NA '14	*d*
Comprehension	243	**258**	0.32	258*	**267***	0.19
Vocabulary	246	**263**	0.35	255*	**267**	0.25
Overall	243	**260**	0.34	257*	**268***	0.22

NA '14 scores in bold are significantly different from the corresponding NA '09 score. Girls' scores marked with an asterisk differ significantly from the corresponding boys' score for that year.

As was the case in NA '09, Retrieve items were the easiest for both girls (71% correct) and boys (67% correct) in NA '14 (see Figure 4.2). Girls outperformed boys on the Retrieve, Infer, and Interpret & Integrate subscales (by 7, 9, and 8 scale score points, respectively) (see Table 4.2).

Figure 4.2: Mean percent correct scores by reading subprocess and gender, Second class

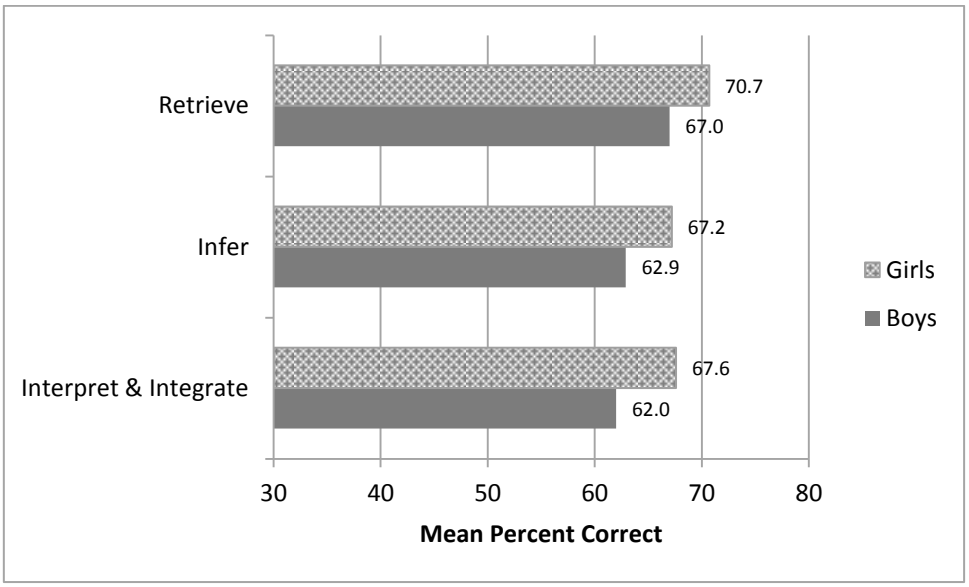


Table 4.2: Mean pupil achievement scores in English reading by subprocess, year, and gender, Second class

	Boys		*d*	Girls		*d*
	NA '09	NA '14		NA '09	NA '14	
Retrieve	243	**257**	0.29	258*	**264***	0.14
Infer	245	**259**	0.29	256*	**268***	0.25
Interpret & Integrate	244	**257**	0.28	257*	**265***	0.19

NA '14 scores in bold are significantly different from the corresponding NA '09 score. Girls' scores marked with an asterisk differ significantly from the corresponding boys' score for that year.

Proficiency Levels

In NA ’14, the proportion of Second class boys performing at or below Level 1 on the overall English reading scale is 17 percentage points lower than in NA ’09, while the proportion of girls performing at or below Level 1 has decreased by 10 percentage points. In NA ’14, 23% of boys performed at or below Level 1, compared to 20% of girls. There was a four-point increase in the proportion of boys performing at Level 2, from NA ’09 to NA ’14, and a one percentage point increase for girls. In NA ’14, similar proportions of boys and girls (34% and 32%, respectively) performed at Level 2. In NA ’14, 43% of Second class boys performed at or above Level 3 (a 13-point increase from NA ’09), while 48% of girls performed at or above Level 3 (an 8-point increase from NA ’09).

Table 4.3: Percentages of pupils at each proficiency level on the overall reading scale, by gender and year, Second class

	Boys		Girls	
	NA ’09	NA ’14	NA ’09	NA ’14
Below Level 1	12.5	6.5	6.9	3.8
Level 1	27.8	16.9	22.6	16.2
Level 2	29.5	33.8	30.5	31.9
Level 3	22.5	31.3	27.7	32.7
Level 4	7.7	11.6	12.2	15.4

Sixth Class

Overall, in NA ’14, 71% of items (71% Vocabulary, 71% comprehension) were answered correctly by Sixth class girls (see Figure 4.3). Boys performed similarly well, with 69% of items answered correctly overall (70% Vocabulary and 68% comprehension). In NA ’09, 66% of items (64% Vocabulary and 67% Comprehension) were answered correctly by Sixth class girls and 64% overall (63% Vocabulary and 64% Comprehension) by Sixth class boys. As in NA ’09, overall and Vocabulary scale scores did not differ significantly by gender in NA ’14; however, unlike NA ’09, girls significantly outperformed boys on the Comprehension subscale in NA ’14. Both boys’ and girls’ mean scores for Reading Vocabulary, Reading Comprehension and overall reading are significantly higher in NA ’14 than in NA ’09 (see Table 4.3).

Figure 4.3: Mean percent correct scores by reading component and gender, Sixth class

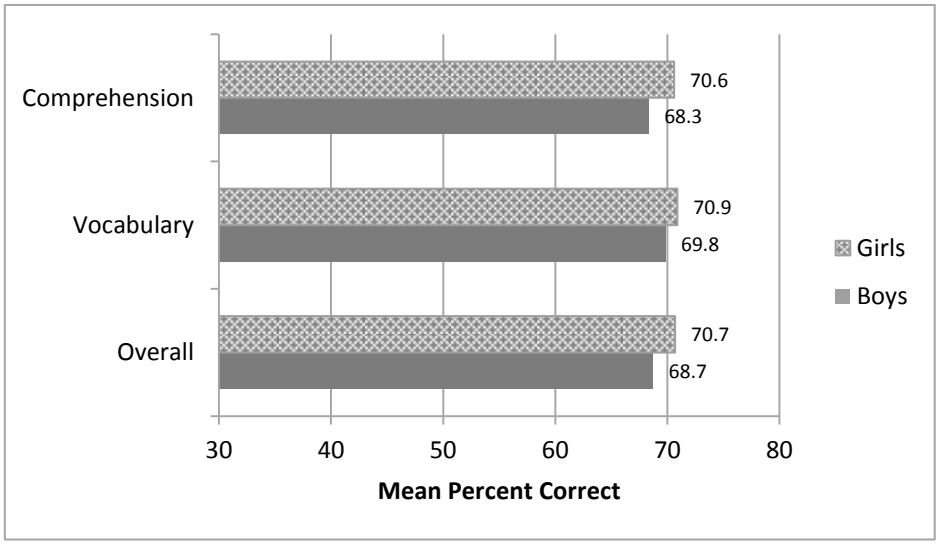


Table 4.4: Mean pupil achievement scores in English reading by component, year, and gender, Sixth class

	Boys			Girls		
	NA '09	NA '14	*d*	NA '09	NA '14	*d*
Comprehension	247	**258**	0.20	253	**263***	0.21
Vocabulary	249	**264**	0.30	252	**267**	0.32
Overall	248	**261**	0.25	252	**265**	0.27

NA '14 scores in bold are significantly different from the corresponding NA '09 score. Girls' scores marked with an asterisk differ significantly from the corresponding boys' score for that year.

With respect to reading process subscales, items assessing Retrieve were found to be the easiest for both girls and boys (75% and 72% correct, respectively), with Interpret & Integrate items the most difficult (65% correct for girls and 64% correct for boys; see Figure 4.4). Girls' mean scores were significantly higher than boys' on both the Retrieve and Examine & Evaluate subscales (see Table 4.4). This represents a change from NA '09, when no gender differences were found on any of the reading process subscales at the Sixth class level.

Figure 4.4: Mean percent correct scores by reading subprocess and gender, Sixth class

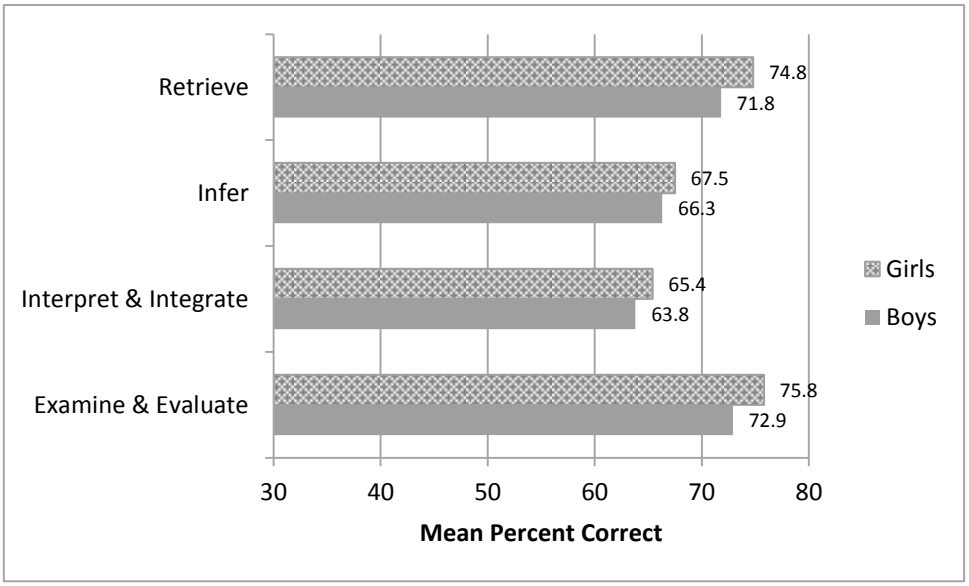


Table 4.5: Mean pupil achievement scores in English reading by subprocess, gender, and year, Sixth class

	Boys			Girls		
	NA '09	**NA '14**	***d***	**NA '09**	**NA '14**	***d***
Retrieve	247	**255**	0.16	253	**264***	0.23
Infer	248	**259**	0.22	252	**261**	0.17
Interpret & Integrate	249	**257**	0.18	251	**260**	0.17
Examine & Evaluate	248	**252**	0.09	253	257*	0.09

NA '14 scores in bold are significantly different from the corresponding NA '09 score. Girls' scores marked with an asterisk differ significantly from the corresponding boys' score for that year.

Proficiency Levels

At Sixth class, in NA '14, 27% of boys performed at or below Level 1 on the overall reading scale (a decrease of 11 percentage points from NA '09; see Table 4.6), compared to 23% of girls (a 9-point decrease from NA '09). Similar proportions of boys and girls performed at Level 2 in NA '14 (32% and 31%, respectively), representing a 4-point increase for boys from NA '09, and a 1-point decrease for girls. The proportion of boys performing at or above Level 3 in NA '14 increased by 7 percentage points from NA '09, to 42%, while the percentage of girls increased by 11 points to 46%.

Table 4.6: Percentages of pupils at each proficiency level on the overall reading scale, by gender and year, Sixth class

	Boys		Girls	
	NA '09	NA '14	NA '09	NA '14
Below Level 1	12.2	6.2	7.7	4.0
Level 1	25.2	20.3	24.8	19.4
Level 2	28.1	31.6	32.3	30.9
Level 3	24.6	28.2	25.4	30.9
Level 4	10.0	13.8	9.8	14.8

Mathematics

Second Class

In NA '14, 61% of items were answered correctly by girls taking the Second class mathematics test (compared with 57% in NA '09), with 63% answered correctly by boys (compared with 58% in NA '09; see Figure 4.5). Overall mean scale scores for both girls and boys participating in NA '14 were significantly higher than for those who participated in NA '09 (see Table 4.5). Boys had an overall mean score that was 4 scale score points higher than girls in NA '09, and this difference was not significant. In NA'14, boys had a mean score that was 5 points higher than that of girls, and the difference was statistically significant.

Of the content strand subscales, Shape & Space was the easiest for both girls (69% correct) and boys (68% correct), while Measures items proved to be the most difficult (53% correct for girls and 56% for boys; see Figure 4.5). For both girls and boys, mean subscale scores were significantly higher in NA '14 than in NA '09 for all content areas except Data. Boys in NA '14 significantly outperformed girls on the Measures and Data subscales, but did not differ significantly from girls on any of the other content area subscales. In NA '09, no gender differences were found on any of the content subscales at the Second class level.

Figure 4.5: Mean percent correct scores by maths content area and gender, Second class

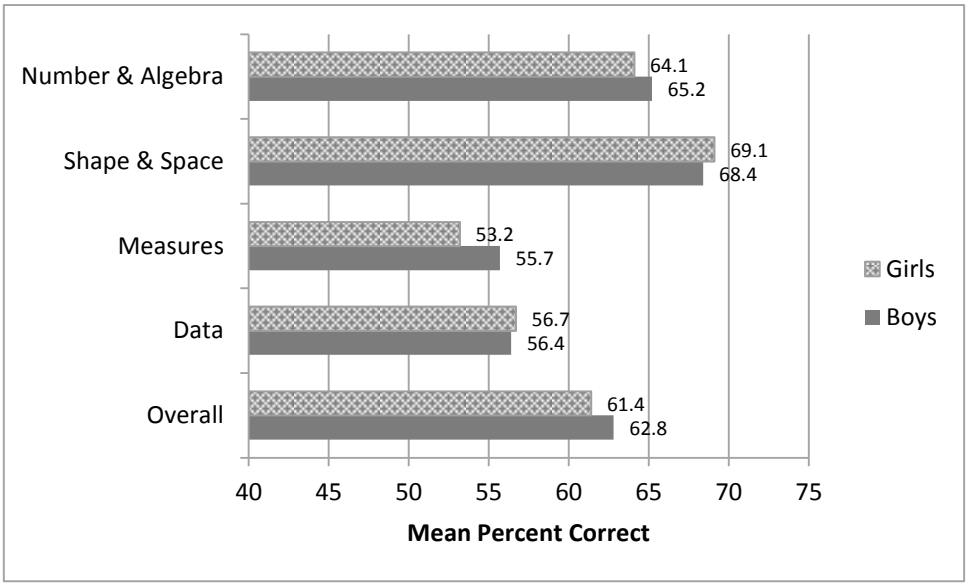


Table 4.7: Mean pupil achievement scores in mathematics, by content strand, gender and year, Second class

	Boys			Girls		
	NA '09	**NA '14**	***d***	**NA '09**	**NA '14**	***d***
Number & Algebra	251	**267**	0.31	249	**264**	0.30
Shape & Space	249	**258**	0.17	251	**260**	0.20
Measures	252	**265**	0.27	248	**258***	0.22
Data	251	256	0.12	249	251*	0.05
Overall	252	**266**	0.29	248	**261***	0.26

NA '14 scores in bold are significantly different from the corresponding NA '09 score. Girls' scores marked with an asterisk differ significantly from the corresponding boys' score for that year.

The easiest process subscale for both girls and boys at Second class was the Understand & Recall subscale (75% correct for both genders). Items assessing the Apply & Problem Solve process were most difficult for both girls (52%) and boys (56%) (Figure 4.6). Boys scored significantly higher on the Apply & Problem Solve scale than did girls (Table 4.8). In NA '09, no gender differences were found on any of the process subscales. Boys' scores in NA '14 were significantly higher than those of boys in NA '09 for all five of the process subscales, while girls in NA '14 significantly outperformed their NA '09 counterparts on all process subscales except Implement.

Figure 4.6 Mean percent correct scores by maths process skill and gender, Second class (NA ’14)

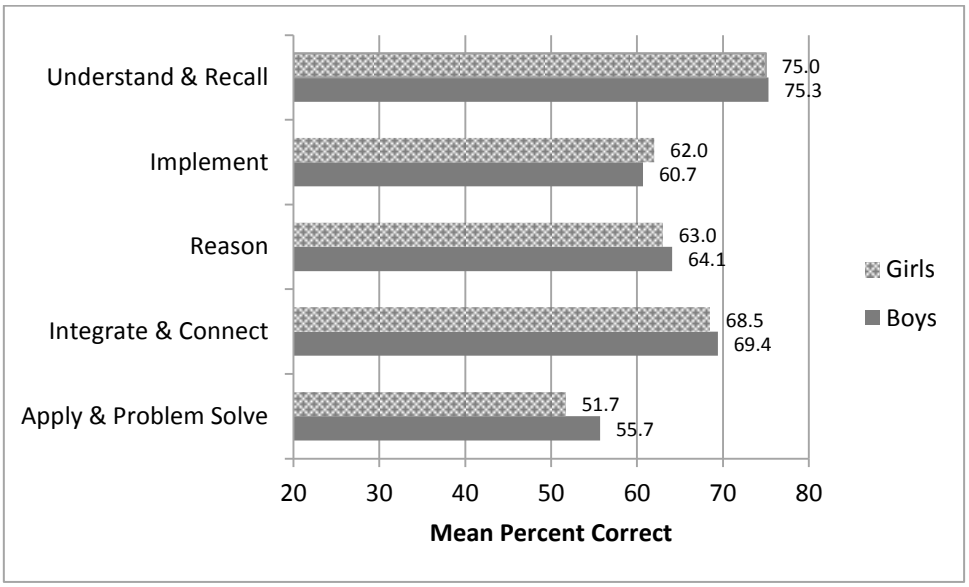


Table 4.8: Mean pupil achievement scores in mathematics, process skill, gender and year, Second class

	Boys			Girls		
	NA ’09	NA ’14	*d*	NA ’09	NA ’14	*d*
Understand & Recall	250	**261**	0.22	250	**260**	0.20
Implement	248	**258**	0.19	252	259	0.15
Reason	251	**269**	0.34	249	**266**	0.36
Integrate & Connect	251	**261**	0.20	249	**257**	0.19
Apply & Problem Solve	253	**266**	0.26	247	**258***	0.23

NA ’14 scores in bold are significantly different from the corresponding NA ’09 score. Girls’ scores marked with an asterisk differ significantly from the corresponding boys’ score for that year.

Proficiency Levels

In NA ’14, at Second class, one quarter of boys performed at or below Level 1 on the overall mathematics scale (a decrease of 11 percentage points from NA ’09; see Table 4.9), compared to 26% of girls (a decrease of 8 percentage points from NA ’09). There was little change from NA ’09 in the proportions of boys and girls performing at Level 2 (a 3-point decrease for boys and for girls). In NA ’14, almost half of Second class boys (49%) performed at or above Level 3 (an increase of 13 percentage points from NA ’09), compared to 45% of girls (a 12-point increase from NA ’09).

Table 4.9: Percentages of pupils at each proficiency level on the overall mathematics scale, by gender and year, Second class

	Boys		Girls	
	NA '09	NA '14	NA '09	NA '14
Below Level 1	10.3	6.8	9.6	5.6
Level 1	24.7	18.0	25.5	20.8
Level 2	28.6	25.7	31.8	28.9
Level 3	24.8	32.9	25.1	32.5
Level 4	11.5	16.7	7.9	12.3

Sixth Class

Sixth class girls and boys performed similarly well on the overall mathematics scale, with a mean percent correct score of 59% for girls (up from 53% in NA '09) and 58% for boys (up from 56% in NA '09). Sixth class girls in NA '14 scored 13 points higher overall than girls in NA '09, while boys in NA '14 scored 11 points higher than boys in NA '09 (both statistically significant increases; see Table 4.7). In NA '14, boys and girls were not found to differ significantly in their overall performance on the Sixth class maths test, though boys had a mean score that was 4 points higher than that of girls.

At Sixth class, Number & Algebra items were the easiest for both girls (62% correct) and boys (64%). Measures items were the most difficult for girls (40% correct) and for boys (43% correct) (Figure 4.8). The only gender difference on the content area subscales was on Measures, where boys scored significantly higher than girls (see Table 4.10). In NA '09, no mean content scale scores were found to differ by gender. Girls in NA '14 scored significantly higher than their NA '09 counterparts all content subscales. Boys in NA '14 significantly outperformed boys in NA '09 on all content subscales.

Figure 4.7: Mean percent correct scores by maths content area and gender, Sixth class (NA '14)

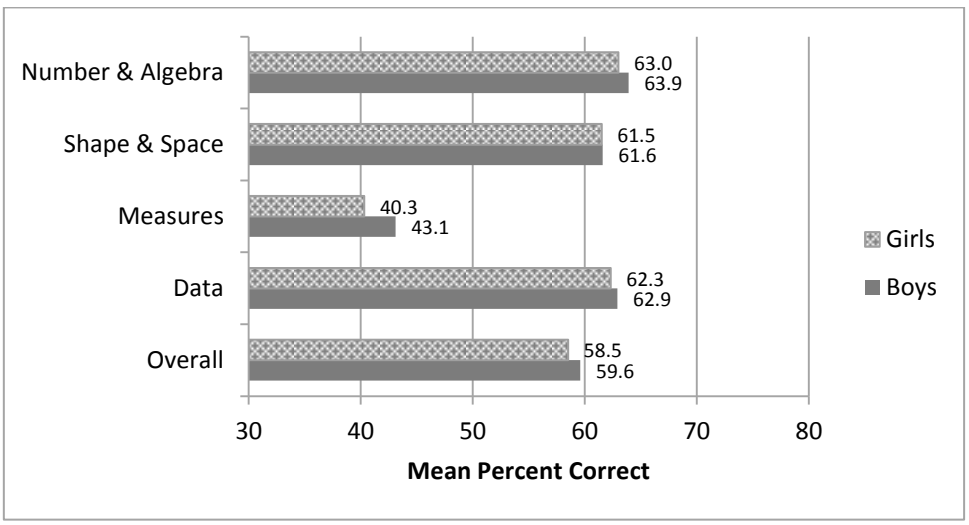


Table 4.10: Mean pupil achievement scores in mathematics, by content strand, gender and year, Sixth class

	Boys			Girls		
	NA '09	**NA '14**	***d***	**NA '09**	**NA '14**	***d***
Number & Algebra	253	**263**	0.20	247	**259**	0.25
Shape & Space	251	**262**	0.23	249	**263**	0.30
Measures	254	**262**	0.15	246*	**255***	0.21
Data	251	**260**	0.17	249	**258**	0.22
Overall	253	**264**	0.21	247	**260**	0.27

NA '14 scores in bold are significantly different from the corresponding NA '09 score. Girls' scores marked with an asterisk differ significantly from the corresponding boys' score for that year.

In terms of the process subscales, Reason items were found to be the easiest for both genders (67% correct for girls and 66% correct for boys). As at Second class, Apply & Problem Solve items were the most difficult, with 51% answered correctly by boys and 47% by girls (see Figure 4.8). The only gender difference in process subscale scores was on the Apply & Problem Solve subscale, with Sixth class boys scoring significantly higher than Sixth class girls (see Table 4.11). No gender difference in process subscale scores were found in NA '09. In NA '14, girls scored significantly higher than girls in NA '09 on all process subscales, while boys in NA '14 also scored significantly higher than boys in NA '09 on all process subscales.

Figure 4.8 Mean percent correct scores by maths process skill and gender, Sixth class

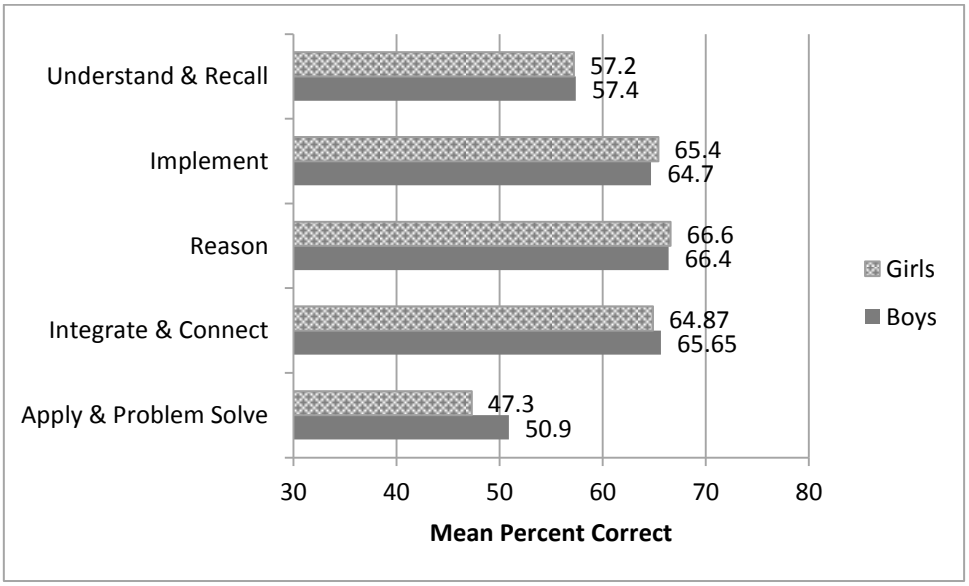


Table 4.11: Mean pupil achievement scores in mathematics, process skill, gender and year, Sixth class

	Boys			Girls		
	NA '09	NA '14	*d*	NA '09	NA '14	*d*
Understand & Recall	252	**260**	0.18	249	**260**	0.25
Implement	251	**262**	0.24	249	**263**	0.30
Reason	252	**262**	0.21	248	**261**	0.26
Integrate & Connect	252	**258**	0.12	248	**257**	0.18
Apply & Problem Solve	254	**263**	0.18	245	**256***	0.21

NA '14 scores in bold are significantly different from the corresponding NA '09 score. Girls' scores marked with an asterisk differ significantly from the corresponding boys' score for that year.

Proficiency Levels

In NA '14, similar proportions of boys (26%) and girls (27%) performed at or below Level 1 on the overall mathematics scale (a 7-point and an 8-point decrease from NA '09, respectively; see Table 4.12). There was little change in the proportion of boys and girls performing at Level 2 (a 1-point and a 2-point increase, respectively). At Sixth class, 44% of boys performed at or above Level 3 (a 6 percentage point increase from NA '09), while 41% of girls performed at or above Level 3 (also a 6-point increase from NA '09).

Table 4.12 Percentages of pupils at each proficiency level on the overall mathematics scale, by gender and year, Sixth class

	Boys		Girls	
	NA '09	NA '14	NA '09	NA '14
Below Level 1	9.2	6.7	9.8	4.6
Level 1	23.6	19.1	25.6	22.5
Level 2	29.4	30.7	29.8	32.0
Level 3	26.3	26.6	24.5	27.7
Level 4	11.4	17.0	10.3	13.2

Summary

At both grade levels, and in both domains, overall mean scores in NA '14 are higher than the corresponding NA '09 mean scores for both boys and girls. In NA '09, the only significant gender difference in overall performance was in English reading at the Second class level, where girls outperformed boys. In NA '14, Second girls significantly outperformed boys on the overall reading scale, while boys significantly outperformed girls on the overall Mathematics scale. No gender differences were found at the Sixth class level.

There were decreases in the proportion of boys and girls performing at the lowest proficiency levels (Level 1 and below) in each domain at each grade level, with the largest

drop occurring in reading for boys in Second class, and the smallest drop occurring in mathematics for boys at Sixth class.

Chapter 5: Performance and School Disadvantaged Status

This chapter describes English reading and mathematics achievement by school DEIS/SSP status[12]. The English reading performance (overall, Comprehension, and Vocabulary) of Second and Sixth class pupils in urban and rural DEIS and non-DEIS schools is described in terms of mean scale scores and proficiency levels (mean percent correct scores are reported in the e-appendix). This is followed by a similar description of overall mathematics performance in each school type. Comparisons to NA '09 achievement outcomes are made throughout.

Percentages of pupils at Second and Sixth class attending different school types in NA '09 and NA '14 are presented in Table 5.1. As this table shows, similar proportions of the NA '14 and NA '09 samples attended DEIS/SSP schools. With respect to pupils from non-DEIS schools, a slightly higher proportion of NA '14 pupils attended urban schools, compared to NA '09. As noted in Chapter 2, the National Assessments include SSP/DEIS schools in proportion to their representation in the population. One consequence of this is that the standard errors may be too large to pick up on differences that might otherwise be statistically significant. Hence, the outcomes reported here can only be considered indicative.

Table 5.1: Percentages of pupils attending various types of schools, by grade level and year

	Second		Sixth	
SSP/DEIS Status	**NA '09**	**NA '14**	**NA '09**	**NA '14**
Urban Band 1	9	8	9	8
Urban Band 2	10	9	9	10
Urban, non-DEIS	42	60	45	60
Rural DEIS	4	2	4	2
Rural, non-DEIS	35	22	33	20

English Reading

Second Class

Overall Performance

At the Second class level, NA '14 mean scores on the overall reading scale, the Vocabulary subscale, and the Comprehension subscale, were significantly higher than NA '09 scores for all school types except rural DEIS schools where, it should be noted, performance was already high in NA '09 (see Table 5.2). Rural non-DEIS schools scored 9 points higher overall in NA '14 than in NA '09, while urban non-DEIS schools saw an increase of 16 scale points. Urban Band 1 schools' overall mean score increased by 14 scale points from NA '09 to NA

[12]School Support Programme (SSP) under DEIS (Delivering Equality of opportunity In Schools).

’14, while the largest observed increase was in Urban Band 2 schools, where the overall reading mean score was 27 scale points higher in NA ’14 than in NA ’09.

In NA ’14, at Second class, pupils in Urban Band 1 schools scored significantly lower on the overall reading, Comprehension, and Vocabulary scales than pupils in all other school types (see Table 5.2). This represents a change from NA ’09, when the mean scores of pupils in Band 1 and Band 2 schools were not found to differ significantly from one another on the overall, Comprehension, or Vocabulary scales, at the Second class level.

Table 5.2: Mean scale scores on the overall English reading scale by SSP/DEIS status, Second class

	Overall			Comprehension			Vocabulary		
	NA ’09	NA ’14	*d*	NA ’09	NA ’14	*d*	NA ’09	NA ’14	*d*
Urban Band 1 (Ref)	218	**232**	0.35	221	**233**	0.30	217	**233**	0.36
Urban Band 2	228	**255***	0.60	231	**255***	0.51	228	**254***	0.58
Urban, non-DEIS	253*	**268***	0.32	252*	**266***	0.28	253*	**269***	0.31
Rural DEIS	262*	267*	0.11	259*	264*	0.10	265*	269*	0.08
Rural, non-DEIS	258*	**268***	0.22	257*	**266***	0.22	257*	**269***	0.25

NA ’14 scores in bold are significantly different from the corresponding NA ’09 mean scores.
NA ’14 scores marked with an asterisk are significantly different from the mean of the reference group.

Proficiency Levels

In Band 1 schools, the proportion of Second class pupils performing at or below Proficiency Level 1 on the overall English reading scale decreased by 20 percentage points from NA ’09 to NA ’14, with an increase of 14 percentage points at Level 2, and an increase of 6 percentage points at Level 3 or higher (see Table 5.3). In Band 2 schools, the proportion of pupils performing at Level 1 or below is 22 percentage points lower in NA ’14 than in NA ’09, with a five-point increase in pupils performing at Level 2, and an increase of 16 percentage points in those performing at or above Level 3. In urban non-DEIS schools, the proportion of pupils performing at or below Level 1 is 12 percentage points lower in NA ’14 than in NA ’09, with a less than one percentage point increase in those performing at Level 2, and a 12-point increase in those performing at or above Level 3. In rural DEIS schools, the percentage of Second class pupils performing at or below Level 1 is 15 percentage points lower in NA ’14 than in NA ’09, with a 14 point increase in those performing at Level 2, and a one-point change increase in those performing at or above Level 3. In rural non-DEIS schools, the percentage of Second class pupils performing at Level 1 or below decreased by 10 percentage points from NA ’09 to NA ’14, with a one-point increase at Level 2, and a 9-point increase at Level 3 and above (see Table 5.3).

Table 5.3 Percentages of pupils at each proficiency level on the overall English reading scale, by DEIS/SSP status and year, Second class

	Urban Band 1		Urban Band 2		Urban, non-DEIS		Rural DEIS		Rural, non-DEIS	
	09	14	09	14	09	14	09	14	09	14
	%	%	%	%	%	%	%	%	%	%
Below Level 1	21.5	15.5	16.4	5.1	8.8	4.9	3.9	6.1	7.1	2.8
Level 1	42.0	28.4	33.4	23.2	22.8	14.3	27.5	10.8	22.5	16.5
Level 2	24.7	38.4	31.7	37.1	31.6	32.1	23.2	36.8	29.9	30.9
Level 3	10.4	16.1	16.5	25.2	26.8	33.5	33.8	32.4	28.0	35.0
Level 4	1.5	1.7	2.0	9.5	10.1	15.2	11.6	14.0	12.5	14.7

Sixth Class

Overall Performance

At Sixth class, overall, Comprehension, and Vocabulary mean scores in NA ’14 were significantly higher than the equivalent NA’09 scores for Band 2 schools (an increase of 14 scale points, overall), and for urban and rural non-DEIS schools (increases of 13 and 16 points, respectively, on the overall reading scale; see Table 5.4).

Band 1 mean scores on the overall, Comprehension and Vocabulary scales were 13, 12 and 14 points higher, respectively in NA’14 than in NA ’09, while in rural DEIS schools, NA ’14 mean scores were 16 scale points higher overall (12 points higher for Vocabulary and 19 points higher for comprehension) than the corresponding mean scores for rural DEIS schools in NA ’09. However, given the comparatively large standard errors in NA ’09 (see Tables A5.4a-c), these differences are not statistically significant, although the effect size for Band 1 schools (*d*=0.29) is similar to the effect sizes for other school types (see Table 5.4) and can be interpreted as being substantively important.

As at Second class, in NA’14, overall, Comprehension and Vocabulary mean scores for Sixth class in Band 1 schools were significantly lower than the mean scores for all other school types. This contrasts with NA’09, where Band 1 mean scores for Sixth class did not differ from either Band 2 or rural DEIS schools.

Table 5.4: Mean scale scores on the overall English reading scale by SSP/DEIS status, Sixth class

	Overall			Comprehension			Vocabulary		
	NA '09	NA '14	*d*	NA '09	NA '14	*d*	NA '09	NA '14	*d*
Urban Band 1 (Ref)	220	233	0.29	221	233	0.27	221	235	0.30
Urban Band 2	232	**246***	0.29	232	**245***	0.26	231	**248***	0.34
Urban, non-DEIS	254*	**267***	0.27	253*	**264***	0.23	254*	**270***	0.32
Rural DEIS	255	272*	0.34	256	270*	0.27	255	275*	0.41
Rural, non-DEIS	252*	**268***	0.32	253*	**265***	0.24	251*	**270***	0.39

NA '14 scores in bold are significantly different from the corresponding NA '09 mean scores.
NA '14 scores marked with an asterisk are significantly different from the mean of the reference group.

Proficiency Levels

In terms of proficiency levels, the proportion of Sixth class Band 1 pupils performing at or below Level 1 is 16 percentage points lower in NA '14 than in NA '09, with a 7-point increase in the proportion of pupils performing at Level 2, and a 10-point increase at Level 3 and higher (see Table 5.5). In Band 2 schools, the proportion of Sixth class pupils performing at Level 1 or below fell from 50% of pupils to 38%, with a one-point decrease at Level 2, and a 13-point increase at Level 3 and higher. In urban non-DEIS schools, the proportion of Sixth class pupils performing at or below Level 1 fell by 10 percentage points from NA '09 to NA '14, with a corresponding increase of 10 points at Level 3 and higher, and no change in the proportion performing at Level 2. Hence, the reductions in the proportion of urban pupils at or below Level 1 were greater in Band 1 and Band 2 schools than in urban non-DEIS schools. In rural DEIS schools, the percentage of pupils performing at or below Level 1 on the overall English Reading scale is 15 percentage points lower in NA '14 than in NA '09, with a 10-point increase the percentage performing at Levels 3 and 4. In rural non-DEIS schools, 21% of pupils performed at or below Level 1, compared to 30% in NA '09, while there was a 2 percentage point increase at Level 2, and a six-point increase at Level 3 and above.

Table 5.5: Percentages of pupils at each proficiency level on the overall English reading scale, by DEIS/SSP status and year, Sixth class

	Urban Band 1		Urban Band 2		Urban, non-DEIS		Rural DEIS		Rural, non-DEIS	
	09	14	09	14	09	14	09	14	09	14
	%	%	%	%	%	%	%	%	%	%
Below Level 1	21.5	12.5	16.4	9.2	8.8	4.2	3.9	2.2	7.1	3.6
Level 1	42.0	34.8	33.4	29.0	22.8	17.5	27.5	14.2	22.5	17.8
Level 2	24.7	31.4	31.7	30.3	31.6	31.3	23.2	28.3	29.9	31.8
Level 3	10.4	17.9	16.5	22.6	26.8	31.4	33.8	43.6	28.0	29.8
Level 4	1.5	3.4	2.0	9.0	10.1	15.6	11.6	11.7	12.5	17.0

Mathematics

Second Class

Overall Performance

At the Second class level, mean mathematics scores for rural DEIS and rural non-DEIS schools changed little from NA ’09 (where scores were already high) to NA ’14 (4 scale score points higher in NA ’14 for both rural DEIS and non-DEIS schools; see Table 5.6). In Band 1 schools, the NA ’14 Second class mean mathematics scores is 13 scale points higher than the corresponding NA ’09 score; however, this difference is not statistically significant, arising, at least in part, from the large standard errors observed in NA ’09. Nevertheless, the effect size of 0.28 can be considered to be substantively important. The mean score of pupils in urban non-DEIS increased significantly from NA ’09 to NA ’14, by a margin of 19 scale points. The largest increase, however, was seen in Band 2 schools; the NA ’14 Second class maths mean score is 29 scale points higher than the equivalent NA ’09 Band 2 mean score.

In NA ’14, at Second class, pupils in Urban Band 1 schools scored significantly lower on the overall mathematics scale than pupils in all other school types (see Table 5.6). In NA ’09, the mean scores of pupils in Band 1 and Band 2 schools were not found to differ significantly.

Table 5.6: Mean scale scores on the overall mathematics scale, by SSP/DEIS status and year, Second class

	NA ’09	**NA ’14**	***d***
Urban Band 1 (Ref)	218	231	0.28
Urban Band 2	230	**259***	0.62
Urban, non-DEIS	251*	**270***	0.39
Rural DEIS	266*	270*	0.10
Rural, non-DEIS	259*	263*	0.08

NA ’14 scores in bold are significantly different from the corresponding NA ’09 mean scores.
NA ’14 scores marked with an asterisk are significantly different from the mean of the reference group.

Proficiency Levels

In Band 1 schools, the proportion of Second class pupils performing at or below Proficiency Level 1 on the overall mathematics scale is 10 percentage points lower in NA ’14 than in NA ’09 (a 13-point decrease below Level 1, and a 3-point increase at Level 1), 3 points higher at Level 2, and 7 points higher at Levels 3-4 combined. Larger changes can be seen in Band 2 schools where, in NA ’14, 27% of pupils were found to perform at Level 1 or below, compared to 52% in NA ’09. At Level 2, there was a 4 percentage point increase from NA ’09 to NA ’14, while the proportion of Second class pupils performing at Level 3 or higher is 43% in NA ’14, up from 21% in NA ’09. In urban non-DEIS schools, the proportion of pupils performing at or below Level 1 is 12 percentage points lower in NA ’14 than in NA ’09, with a six-point decrease at Level 2 and a 17-point increase in those performing at Level 3 or

higher. In rural DEIS schools, there was a one percentage point increase in performance at or below Level 1 from NA ’09 to NA ’14, a 5-point decrease at Level 2, and a 4-point increase at Level 3 or higher. In rural non-DEIS schools, the proportion of pupils performing at or below Level 1 fell by 3 percentage points, with a 2-point decrease at Level 2, and a 5-point increase in performance Level 3 or higher (see Table 5.7).

Table 5.7 Percentages of pupils at each proficiency level on the overall mathematics scale, by DEIS/SSP status and year, Second class

	Urban Band 1		Urban Band 2		Urban, non-DEIS		Rural DEIS		Rural, non-DEIS	
	09	14	09	14	09	14	09	14	09	14
	%	%	%	%	%	%	%	%	%	%
Below Level 1	27.1	14.3	18.8	6.5	8.0	4.7	5.8	4.6	6.4	6.5
Level 1	34.5	37.6	33.2	20.0	24.6	16.4	17.4	19.6	22.6	19.0
Level 2	24.3	27.0	27.4	30.9	32.9	27.0	26.8	22.1	29.8	27.9
Level 3	12.0	19.0	16.4	32.7	26.2	34.6	40.3	38.1	27.1	32.3
Level 4	2.0	2.1	4.2	10.0	8.3	17.3	9.7	15.6	14.1	14.3

Sixth Class

Overall Performance

At Sixth class, NA ’14 mean maths scores are significantly higher than NA ’09 scores for urban non-DEIS schools (a 10-point increase) and rural DEIS schools (a 36-point increase; see Table 5.8). Mean scores for Band 1, Band 2 and rural non-DEIS schools were 14, 10 and 12 points higher, respectively, in NA’ 14 than in NA’ 09; however these differences are not statistically significantly, though the effect sizes for Band 1 and rural non-DEIS schools can be considered important. The non-significant difference in the case of Band 1 schools arises, in part, because of the large standard error observed in NA ’09.

At Sixth class, in NA ’14, the Band 1 mean mathematics score is significantly lower than the mean scores for all other school types, except Band 2 schools. In NA ’09, the Band 1 mean score was found to differ significantly from the mean scores of non-DEIS urban and rural schools, but not from Band 2 or rural DEIS mean scores.

Table 5.8: Mean scale scores on the overall mathematics scale, by SSP/DEIS status and year, Sixth class

	NA '09	NA '14	*d*
Urban Band 1 (Ref)	219	233	0.29
Urban Band 2	231	241	0.21
Urban, non-DEIS	254*	**264***	0.21
Rural DEIS	245	**281***	0.77
Rural, non-DEIS	256*	268*	0.24

NA '14 scores in bold are significantly different from the corresponding NA '09 mean scores. NA '14 scores marked with an asterisk are significantly different from the mean of the reference group.

Proficiency Levels

In Band 1 schools, the proportion of Sixth class pupils performing at or below Level 1 on the overall mathematics scale is 50% in NA '14, compared to 64% in NA '09. The proportion performing at Level 2 increased by 11 percentage points, with a six-point increase at Levels 3-4 (see Table 5.8). In Band 2 schools, the percentage of pupils performing at Level 2 changed little from NA '09 to NA '14, while performance at or below Level 1 decreased by 10 percentage points, with a corresponding increase in the percentage of pupils performing at Levels 3-4. In rural DEIS schools, 18% of Sixth class pupils in NA '14 performed at or below Level 1, compared to 31% in NA '09. There was a six-point increase at Level 2, and a 12-point increase at Level 3 and higher. In rural non-DEIS schools, 13% of Sixth class pupils in NA '14 performed at or below Level 1, down from 36% of pupils in NA '09. There was a small increase in the percentage performing at Level 2 (3 percentage points), and a 20-point increase in the percentage performing at Levels 3-4 on the overall mathematics scale (see Table 5.9).

Table 5.9 Percentages of pupils at each proficiency level on the overall mathematics scale, by DEIS/SSP status and year, Sixth class

	Urban Band 1		Urban Band 2		Urban, non-DEIS		Rural DEIS		Rural, non-DEIS	
	09	14	09	14	09	14	09	14	09	14
	%	%	%	%	%	%	%	%	%	%
Below Level 1	28.4	11.9	15.2	12.8	7.2	5.0	7.5	2.0	10.1	2.0
Level 1	38.0	38.0	37.3	29.0	24.2	19.1	23.4	11.3	26.0	11.3
Level 2	20.7	31.5	27.7	28.5	33.3	32.2	27.1	33.0	29.8	33.0
Level 3	8.0	14.3	14.7	23.2	24.4	28.3	30.7	29.3	24.2	29.3
Level 4	4.9	4.4	5.0	6.4	10.8	15.4	11.3	24.4	9.9	24.4

Summary

For Urban Band 1 DEIS schools, overall mean scale scores were higher in NA ’14 in both domains and at both grade levels; however, only in English reading at Second class was the difference statistically significant. The large standard errors obtained in NA ’09 contributed to this lack of significance. However, a consideration of effect sizes indicate that, in most cases, performance in DEIS Band 1 schools increased by a similar amount compared to other school types. In Urban Band 2 schools, pupils in NA ’14 scored significantly higher than their counterparts in NA ’09 in English reading at Second class and Sixth class, and in mathematics at the Second class level. In NA ’09, there were no significant differences between Band 1 and Band 2 mean scores in either domain, at either class level; in NA ’14, Band 2 pupils significantly outperformed Band 1 pupils in English reading at both grade levels, and in mathematics at Second class. Overall English reading and mathematics mean scores were significantly higher in NA ’14 than in NA ’09 for urban non-DEIS schools, at both grade levels. In rural DEIS schools, NA ’09 and NA ’14 scores differed significantly only in mathematics at Sixth class. In rural non-DEIS schools, NA ’14 mean scores for English reading were significantly higher than in NA ’09, at both grade levels, but did not differ significantly from NA ’09 mean mathematics scores at either grade level.

The proportions of pupils scoring at Level 1 or below on English reading and mathematics were lower at Second and Sixth classes in NA ’14, compared with NA ’09. For example, in reading at Second class, 44% of pupils in DEIS Band 1 schools performed at or below Level 1, compared with 64% in NA ’09, while in Band 2 schools, 28% performed at or below Level 1 in NA ’14, compared with 50% in NA ’09. While the reductions in the proportions of pupils performing at or below Level 1 are welcome, there are still large proportions of pupils performing at these levels, especially in Band 1 schools. Increases in the proportions of pupils performing at Levels 3-4 are also apparent, though these are greater in Band 2 schools than in Band 1 schools. For example, for overall reading in Second class, the proportion performing at Levels 3-4 in Band 1 schools increased from 12% to 18%, while the proportion performing at these levels in Band 2 schools increased from 19% to 35%.

Chapter 6: Summary and Conclusions

As noted in the preface, reporting on the 2014 National Assessments of English and Mathematics involves the publication of two reports:

- The current performance report, which focuses on the achievements of pupils in the Second and Sixth classes, and
- A context report, which provides information on factors relating to teaching and learning of English reading and mathematics, drawing on school-level, classroom-level, pupil-level and parent-level data.

In this chapter, the performance of pupils in the 2014 National Assessments is summarised, and key conclusions are drawn. The context report, which will be published in 2015, will seek to interpret the findings in greater detail, drawing on the outcomes of questionnaires completed by participating pupils, their school principals, their teachers and their parents. It will also offer a set of recommendations relating to the teaching and assessment of English reading and mathematics in primary schools.

Summary

Sample and Tests

The 2014 National Assessments of English Reading and Mathematics (NA ’14) were administered by class teachers, under the supervision of inspectors of the Department of Education and Skills, to a representative sample of over 8,000 pupils in the Second and Sixth classes in 150 primary schools in May 2014. In addition to taking tests of English reading and mathematics, the pupils, their principal teachers, their class teachers and their parents completed questionnaires. At Second class, 94% of selected pupils completed the tests, while at Sixth class, 93% of pupils did so. Just 1% of pupils at each class level were exempted from testing because of special educational needs or lack of proficiency in English, while the remainder were absent from school.

The tests used in NA ’14 were secure curriculum-based instruments developed for the 2009 National Assessments (NA ’09) and updated for NA ’14 through the inclusion of a small number of new items to replace those that were released following NA ’09 (see Chapter 2). At each grade level, there were multiple test booklets in each domain, allowing for greater coverage of content and processes. Item Response Theory scaling was used to link booklets, and to place performance in 2014 on the same scales developed for NA ’09. In 2009, the mean score for each scale and subscale was set at 250, and the standard deviation at 50. In addition, fixed percentages of pupils were assigned to proficiency levels in each domain at each grade level, such that 10% of pupils performed below Level 1, 25% at Level 1, 30% at Level 2, 25% at Level 3 and 10% at Level 4.

English Reading

Overall performance on English reading in Second class was significantly higher in NA ’14 than in NA ’09 by 14 score points. Overall performance in Sixth class increased by 13 score points. The corresponding effect sizes or standardised differences in standard deviation units were 0.29 and 0.26 respectively. These effect sizes can be interpreted as being substantively important (What Works Clearinghouse, 2014). Significant performance increases were also observed for the Reading Vocabulary and Reading Comprehension component subscales. Increases at Second class were about the same for the Retrieve, Infer and Interpret & Integrate reading processes, while pupils at Sixth class made more progress on Retrieve, Infer and Interpret & Integrate than on Examine & Evaluate (an additional process assessed at this level). At the Second class level, overall reading scores were significantly higher at each of five key percentile markers, with increases ranging from 9 points (90^{th} percentile) to 19 (25^{th} percentile). At Sixth class level, increases ranged from 12 points (50^{th}, 75^{th} and 90^{th} percentiles) to 17 (25^{th} percentile). In NA ’14, 22% of pupils in Second class performed at or below Proficiency Level 1, compared with 35% in NA ’09, while 46% performed at Levels 3-4, compared with 35% in NA ’09. At Sixth class, 25% performed at or below Level 1, again compared with 35% in NA ’09, while 44% again performed at Levels 3 and 4 combined, compared with 35% in NA ’09. Hence, the targets established in the *National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020* (to reduce the proportion performing at or below Level 1 by 5 percentage points, and to increase the proportion performing at or above Level 3 by the same amount) were reached at both class levels.

Mathematics

Overall performance on mathematics in Second and Sixth classes was significantly higher in NA ’14 than in NA ’09, by 14 and 12 score points, respectively. The effect size at Second class was 0.28, and the effect size at Sixth class was 0.24, both of which can be interpreted as being substantively important (the latter being just below the US What Works Clearinghouse criterion of 0.25). At Second class, significant increases in performance were observed on three of four content areas assessed, and on all five mathematics processes. The exception was the Data content area, where the increase was just 4 score points. At Sixth class, there were significant increases on all content areas, and all processes. At both Second and Sixth class levels, there were increases in performance at each key percentile marker, with the largest increases at the lower markers (the 10^{th}, 25^{th} and 50^{th} percentiles). Twenty-six percent of pupils in Second class performed at Proficiency Level 1 or below compared with 35% in NA ’09. Forty-seven percent performed at Levels 3-4, compared with 35% in NA ’09. At Sixth class, 27% performed at or below Level 1, and 42% performed at Levels 3-4. Again, the targets established in the National Strategy were reached for pupils described as lower-achieving (those at or below level 1) and higher-achieving (those at or above level 3) at both grade levels.

Gender

In NA ’14, girls in Second class significantly outperformed boys on the overall English reading scale by 7 score points. Girls also achieved a significantly higher mean score on Reading Comprehension (by 9 points). A difference of 4 score points in favour of girls on Reading Vocabulary was not statistically significant, whereas in NA ’09, significant differences in favour of girls were found on Vocabulary, Comprehension and overall reading. It is noticeable that the size of the difference in favour of girls on overall reading declined from 14 points to 7 since NA ’09. Related to this, increases in overall reading, Reading Vocabulary and Reading Comprehension in NA ’14 (compared with NA ’09) were greater among boys in Second class than among girls, with the largest increase (17 score points) being achieved by boys on reading Vocabulary. Both boys and girls in Second class in NA ’14 improved on all three reading process subscales, compared with their counterparts in NA ’09. The proportion of Second class boys performing at or below Level 1 on the overall English reading scale decreased by 17 percentage points, when compared with boys in NA ’09, while the proportion of girls performing at or below Level 1 decreased by 10 percentage points. In NA ’14, 43% of Second class boys performed at or above Level 3 (a 13-point increase from NA ’09), while 48% of girls performed at or above Level 3 (an 8-point increase from NA ’09).

At Sixth class, girls in NA ’14 had a significantly higher mean Reading Comprehension score (by 5 score points), compared with boys. Mean score differences in favour of girls on Reading Vocabulary (3 points) and on overall reading (4 points) were not statistically different. In NA ’09, no significant differences were found on Reading Vocabulary, Reading Comprehension or overall reading. In NA ’14, boys and girls increased their performance relative to their same-gender counterparts on all three scales. In Sixth class, boys improved significantly on all four process subscales, while girls improved on Retrieve Infer, and Interpret & Integrate, but not on Examine & Evaluate. In contrast to the situation at Second class, increases at Sixth class were similar for both genders. At Sixth class, there was an 11 percentage point reduction in the proportion of boys, and a 9-point reduction in the proportion of girls performing at or below Level 1. There was a 7 percentage point increase in the proportion of boys, and an 11-point increase in the proportion of girls performing at Levels 3-4.

Boys in Second class had a higher mean score on overall mathematics than girls in NA ’14, and the difference (5 points) was statistically significant. This represents a change from NA ’09, where no overall gender difference was found for Second class mathematics. Boys significantly outperformed girls on the Measures, Data, and Apply & Problem Solve subscales in NA ‘14, but did not differ significantly from girls on any of the other content or process subscales. With the exception of Data, boys and girls in NA ’14 had significantly higher mean scores on all content areas and processes than their same-sex counterparts in NA ’09. The largest difference, for both boys and girls, was on Number & Algebra (a 15-16 points gain). At Sixth class level, boys in NA ’14 had a 4-point advantage over girls on overall

mathematics, but the difference was not statistically significant. Boys were significantly ahead of girls in NA ’14 on just one process subscale (Apply & Problem Solve, by 7 points), and on one content subscale (Measures, also by 7 points). Other subscale differences were not statistically significant.

At the Second class level, there was an 11 point decrease in the proportion of boys and an 8-point decrease in the proportion of girls performing at Level 1 or below in NA ’14 overall Mathematics, compared with NA ’09. There was a 13-point increase in the proportion of boys and a 12-point increase in the proportion of girls performing at Levels 3-4. At Sixth class Level, there was a 7 percentage point decrease in the proportion of boys performing at Level 1 or below, compared with NA ’09, with an 8-point reduction in the proportion of girls. On the other hand, there was a six-point increase in the proportion of boys and a six-point increase in the proportion of girls who achieved scores that were at Levels 3-4.

School Disadvantaged Status

Both NA ’09 and NA ’14 included pupils in schools in the School Support Programme under DEIS as part of representative national samples, in proportion to their representation in their respective populations. However, there were insufficient numbers of pupils in DEIS schools in the two studies to allow for precise estimates of achievement such as mean scores and percentages to be computed and standard errors are large, especially for NA ‘09. Hence, the outcomes summarised here, which only refer to overall performance, should be interpreted with caution, and should be considered in conjunction with the outcomes of other studies of performance in DEIS schools that are based on considerably larger sample sizes, and provide more accurate and stable estimates of achievement (e.g., Weir & Denner, 2013).

Pupils in Second class in DEIS Band 1 schools achieved a mean score on overall reading in NA ’14 that was 14 points higher than in NA ’09, and the difference was statistically significant. The corresponding effect size (0.35) can be interpreted as being substantively important. Pupils in Band 2 schools also had a higher mean overall reading score in NA ’14 (27 points), compared with NA ’09. The corresponding effect size was 0.60, which can be considered large.

Whereas in NA ’09, 64% of pupils in Second class in Band 1 schools performed at or below Proficiency Level 1 on overall reading, 44% performed at this level in NA ’14. The proportion of pupils in Band 1 schools who performed at Proficiency Levels 3-4 increased by just 6 percentage points. In Band 2 schools, 28% performed at or below Level 1 in NA ’14, compared to 50% in NA ’09, while the proportion performing at Levels 3-4 increased from 28% to 35%. A large increase in the proportion of pupils performing at Level 3 in Band 2 schools is especially noteworthy, and, when combined with a small increase at Level 2, confirms that lower-achieving pupils in Band 2 schools made substantive progress since NA ’09.

In Sixth class, the mean overall reading score of pupils in Band 1 schools in NA ’14 was 233 – some 13 points higher than in NA ’09. The difference was not statistically significant, but it converted to an effect size (0.29) than can be interpreted as being substantively important. The overall mean score in Band 2 schools (246) was significantly higher, by 14 score points (effect size = 0.29) than in NA ’09.

In Second class mathematics, pupils in Band 1 school in NA ’14 had a mean score that was 13 points higher than in NA ’09. Again, the difference was not statistically significant. However, the effect size (0.28) can be considered substantively important. In Band 2 schools, there was a significant increase of 29 score points, and an effect size of 0.62, which can be interpreted as being large.

There was a 10 percentage point drop, from 62% to 52%, in the percentage of pupils in Second class in Band 1 schools performing at or below Level 1 on NA ’14, compared with NA ’09, and an increase in the percentage performing at Levels 3-4, from 14% to 21%. At Band 2, 52% performed at or below Level 1 in NA ’09, and this dropped to 27% in NA ’14. Twenty-one percent performed at Levels 3-4 in NA ’09, and this increased to 43% in NA ’14.

Pupils in Sixth class in Band 1 schools in NA ’14 had a mean score on overall mathematics (233) that was higher than that of pupils at the same class level in NA ’09 (219). While the difference (14 points) was not statistically significant, the effect size of 0.29 can be interpreted as being substantively important. There was a smaller increase in Band 2 schools (from 231 points to 241 points), which was not statistically significant.

In NA ’09, 66% of pupils in Band 1 schools performed at or below Level 1 in mathematics, and this dropped to 50% in NA ’14. The proportion performing at Levels 3-4 increased from 13% to 19%. At Band 2, 53% performed at or below Level 1 in NA ’09, and this dropped to 42% in NA ’14, while the proportion performing at Levels 3-4 increased from 20% to 30%. The relatively small changes at Band 2 are consistent with the small change in overall achievement.

Conclusions

In this section, some broad conclusions derived from the outcomes of NA ’14 are drawn. They cover four broad topics: Performance on English Reading and Mathematics; the Literacy and Numeracy Strategy; Gender Differences; and Disadvantage.

Performance on English Reading and Mathematics

Prior to 2014, performance on national assessments of reading literacy increased significantly on just one occasion (among 10-year olds between 1972 and 1980; Mulrooney, 1986). Hence, the significant increases in average performance on overall English reading and mathematics in Second and Sixth classes between NA ’09 and NA ’14, and the ‘substantively important’ effect sizes are to be welcomed. It is especially noteworthy that

these improvements were observed in the context of a national education system, rather than in a small-scale intervention study where more uniformity in approach can be achieved in implementing change. It is also significant that improvements were observed at each of five key percentile ranks in both reading and mathematics at Second and Sixth classes. The reduction in proportions of pupils performing below Proficiency Level 1 in NA '14, which now range from 5-6%, is especially noteworthy as these proportions changed without an increase in either the numbers of exemptions from testing granted by schools, or in absenteeism on the days on which the tests were administered.

As noted in Chapter 2, pupils in Fourth class in Ireland performed well on PIRLS 2011 overall reading literacy, achieving a ranking of 10th of 45 countries, and a mean score that was exceeded by just five countries. Moreover, the proportion of Irish pupils in PIRLS performing at the Advanced benchmark was not very different from the highest performing countries. Ireland will participate in the next round of PIRLS, in 2016, and it will be interesting to observe if the gains achieved in the current study transfer to performance on PIRLS 2016 print reading. Although PIRLS 2011 took place before the implementation of the *National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-20*, it possible that some of the improvements in reading literacy observed in the current study were in place at the time of PIRLS 2011. It is also worth noting that PIRLS 2016 will include an optional test of electronic reading, in which Ireland will also take part. The performance of pupils in Ireland on this assessment will be closely observed in light of increased use of electronic texts in some schools as well moves towards greater use of computers in assessing pupil performance.

It was noted in Chapter 2 that pupils in Fourth grade in Ireland performed relatively less well on TIMSS mathematics than on PIRLS reading literacy. A similar pattern is found on the PISA assessment, where performance on reading literacy has been consistently ahead of mathematics. Ireland is atypical among PISA countries in terms of having a strength in one domain (reading literacy) and a relative weakness in another (mathematics). In most countries, average performance in one domain is consistent with average performance on the other. Since pupils in Fourth class in Ireland will take part in TIMSS in 2015, there will be an opportunity to ascertain if the gains in mathematics observed in the current study are sustained, and if Ireland has improved relative to other TIMSS countries. Since students in Second year in Ireland will take part in TIMSS 2015, there will also be an opportunity to compare the relative performance of Irish students in Fourth class and Second year.

Literacy and Numeracy Strategy

At this time, it is difficult to attribute the improved performance on English reading and mathematics among pupils in Second and Sixth classes to any single factor. As noted in Chapter 2, following the publication of the *National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020* (DES, 2011), a number of initiatives

were put in place to improve standards in literacy and numeracy, including CPD on literacy and numeracy for teachers, increased allocation of class time to teaching English reading and mathematics, reporting of standardised test results of individual pupils to their parents, the reporting of aggregated test results to school Boards of Management and to the Department of Education and Skills, and an enhanced emphasis on literacy and numeracy in the context of school self-evaluation and planning. Other initiatives referred to in the Strategy, such as the expansion of the B.Ed. degree for primary teachers to four years, have begun, but it will take some time before they can be expected to impact on teaching and learning in schools.

A number of initiatives referred to in the National Strategy that have yet to be implemented including the introduction of revised curricula in English and mathematics that place a stronger focus than heretofore on learning outcomes, and on the use of formative assessment. In the case of English, there would seem to be opportunities to enhance links between oral language, reading and writing, in the context of responding to and writing about texts across a range of subject areas, and this work could be expected to strengthen pupils' reading comprehension (Kennedy et al., 2012). Similarly, proposals to strengthen work on oral language in both early years and primary-school settings, including the development of vocabulary and background knowledge, should, if implemented, provide a stronger basis for engaging children in reading comprehension as they move beyond the initial stages of reading acquisition (see Shiel, Cregan, McGough & Archer, 2012). Some of this work can be carried out using the Aistear curriculum framework, both in the context of the free school year for 3-4 year olds, and in early years education across the state-funded sector.

In mathematics, the proposed emphasis on the development of mathematical proficiency in the revised curriculum is to be welcomed, as are increased emphases on the promotion of 'math talk', the development of productive dispositions, the use of more cognitively challenging, and perhaps more open-ended, mathematical tasks, and the use of critical ideas derived from learning paths for assessment and planning (see Dooley et al., 2014). Given the less-than-optimal performance in mathematics of pupils in Ireland relative to their counterparts in other similarly-sized countries observed in studies such as TIMSS 2011, and a need to ensure that all children achieve at their potential, timely development and implementation of a revised mathematics curriculum is very important. However, it might also be appropriate to introduce as soon as possible some of the strategies and activities that the revised curriculum will promote, rather than wait for three or four years.

The finding in the current study that pupils in Second and Sixth classes showed significant improvement on the Apply & Problem Solve mathematics process compared with NA '09 is to be welcomed. However, the percent correct scores achieved by pupils in the current study on Apply & Problem Solve, in Second class (54%) and in Sixth (49%), also suggest room for further growth.

The National Strategy included a number of targets relating to increasing the proportions of pupils performing at the highest proficiency levels in English reading and mathematics, and reducing the proportions performing at the lowest levels. As noted above, all of these targets have been attained well in advanced of the scheduled target date of 2020. It might be noted, however, that NA ’14 represents just one measure, among many, of performance in reading and mathematics, and it would be important to confirm that observed gains transfer to other contexts. TIMSS 2015 and PIRLS 2016 will provide data sets that can be used for this purpose.

It would be important to ensure that, over the remainder of the life of the National Strategy, the gains observed in this study are maintained and indeed improved on where possible. In doing so, it might be noted again that the scope for further substantial progress is probably greater in mathematics than in reading. For example, as noted above, there seems to be scope for further growth in Problem Solving in mathematics.

The National Strategy and subsequent circulars issued by the DES (e.g., DES, 2011b, 2012) place a strong emphasis on the use of test data to guide teaching and learning in school and classroom contexts. The relatively large increases in performance observed in NA ’14 suggest that the norms for existing standardised tests may overestimate pupil performance, and hence may not be very useful for the purposes for which they are being used such as setting school-level targets and identifying students with learning difficulties. This points to a need to benchmark performance on standardised tests used in schools against performance in NA ’14, with a view to revising and re-norming tests, perhaps in parallel with the implementation of revised curricula in English and mathematics.

The National Strategy also referred to a need to raise awareness of the importance of digital literacy and to include a measure of digital literacy as part of the National Assessment of English reading. The inclusion of a test of digital reading in PIRLS 2016 (the e-PIRLS assessment) should provide some initial insights into the performance of pupils in Fourth class on digital reading tasks, and also point to infrastructural issues that could arise if digital literacy were to be assessed in future National Assessments of English reading. It would also seem important, both in the context of developing and implementing the revised mathematics curriculum at primary level, and in planning for future National Assessments of Mathematics, to ensure that adequate attention is paid to the use of ICTs in mathematics, given that Irish 15-year olds in PISA do less well on tests of computer-based mathematics, compared with paper-based mathematics.

Interpreting Gender Differences

Gender differences in NA ’14 were relatively small, with a significant difference of 7 points in favour of girls on overall reading in Second class (down from 14 points in NA ’09), and a non-significant difference of 4 points in favour of girls on overall reading in Sixth (the same as in NA ’09), though there was a significant difference in favour of girls on Reading Comprehension (by 5 points) at that class level. At Second class, the gender gap was reduced because of the stronger performance of boys in NA ’14, compared with NA ’09. The

significant but small gender gap in Second class in NA ’14 (about one seventh of a standard deviation) is equivalent in size to the gender gap in Fourth class in Ireland and internationally described in PIRLS 2011. It is surprising that no gender gap is found on overall reading at Sixth class, though this may relate to the nature of the texts and associated questions used at Sixth class, which may suit boys as well as girls. In PISA 2012 reading literacy, there was a large and significant gender difference in favour of female students in most participating countries, including Ireland. Again, this may reflect the nature of the reading texts and associated questions in PISA, which may favour girls, as well as higher levels of general engagement in reading by girls at post-primary level, compared with boys.

In mathematics in NA ’14, there were small gender differences at Second and Sixth class in favour of boys; the difference at Second was statistically significant, while the difference at Sixth was not. Boys had significantly higher mean scores at both class levels on the Apply & Problem Solve process subscale. In TIMSS 2011 mathematics, a small overall difference in favour of boys was not statistically significant, while subscale differences did not reach statistical significance either. On the basis of the NA ’14 and TIMSS 2011 data, it seems that large gender differences on overall mathematics do not emerge until post-primary level. There we find gender differences on tests like PISA, where, in 2012 in Ireland, 15-year old boys significantly outperformed girls on overall mathematics by one-sixth of an international standard deviation, and on each of seven content and process subscales. In contrast, there are differences in favour of females on Junior Certificate Examination, where, for example, in 2014, 6% more girls than boys achieved a grade C or higher on Higher level mathematics (SEC, 2014).

In Chapter 1, we noted a large difference in favour of boys in Ireland on the PISA Space & Shape subscale, though pupils in Ireland performed less well on PISA Space & Shape than in other mathematics content areas. In NA ’14, no significant differences were found at either Second or Sixth class between boys and girls on the Shape & Space subscale, though girls were slightly ahead at Second class (by 2 points), and at Sixth (by 1 point). It may be that types of spatial reasoning and problem solving activities found in PISA Space & Shape are not emphasised sufficiently in curriculum and assessment in Ireland at either primary or post-primary levels, and that there is an over-emphasis on identifying shapes and their properties.

A recent publication by the Professional Development Service for Teachers (2013) may be helpful in supporting teachers to broaden the experiences of both girls and boys with Shape and Space at primary level, ahead of any future changes in curriculum.

Addressing Disadvantage

As noted earlier, considerable care should be exercised in drawing conclusions about the performance of pupils in different types of DEIS schools in NA ’14 and in NA ’09 as the

sample sizes were too small to obtain precise measures of performance and change. Nevertheless, using the What Works Clearinghouse criterion to evaluate the obtained effect sizes, it can be concluded that substantial progress was made in both DEIS Band 1 and DEIS Band 2 schools on reading literacy between NA '09 and NA '14. The effect size for DEIS Band 2 schools at Second class (0.60) is stronger than in DEIS Band 1 schools (0.35), or in schools in general (0.29). Effect sizes in NA '14 were smaller at Sixth class in Band 1 (0.29) and Band 2 schools (0.29), and were not very different from the effect size for schools in general (0.26).

The effect sizes for overall reading suggest that, while substantive improvements have been made in reading literacy in DEIS schools since NA '09, there has been no real reduction in the gap between pupils in DEIS urban schools and in other school types, except at Second class in Band 2 schools. It may be necessary to support the teachers, parents and children in DEIS Band 1 schools even more intensively over the remainder of the National Strategy if the gap with pupils in other school types is to be narrowed. It would also seem important to ensure that pupils in the Senior classes in DEIS Band 2 build on the large improvements achieved in Second class.

There must also be concern about the large proportion of very low achievers in reading in urban DEIS schools. Forty-four percent of pupils in Second class and 47% in Sixth class in Band 1 schools performed at or below Level 1 in NA '14, while 28% of pupils in Second class in Band 2 and 38% in Sixth class performed at or below Level 1. Nationally, the estimates for Second and Sixth class on overall reading were 22% and 25%, respectively. Hence, again with the exception Second class in Band 2 schools, there are still disproportionately large numbers of struggling readers in DEIS urban schools, and, except for pupils in Second class in Band 2 schools, progression through the proficiency levels between NA '09 and NA '14 has been slow.

The improvements for urban DEIS schools between NA '09 and NA '14 are a little bigger than those reported for pupils in Weir and Denner's (2013) evaluation of the School Support Programme under DEIS in urban schools. When Weir and Denner compared the reaeding performance of the same cohorts of pupils at two points in time (Second class in 2010 and Fifth in 2013; Third class in 2010 and Sixth class in 2013), across Band 1 and Band 2 schools, they found significant improvement of 1.5 scale score points for each cohort, equivalent to an effect size of around 0.10 on a scale with a national mean of 100 and a standard deviation of 15. However, it should be noted that Weir and Denner's study involved the administration of a different test to that used in NA '14, and this may have had an impact on the size of observed improvements. Also, unlike NA '14, it was not possible for Weir and Denner to benchmark observed gains in DEIS schools against up-to-date national standards as they used an older test.

The change in mathematics performance at Second class in DEIS Band 1 schools (from 218 in NA '09 to 231 in NA '14) is not statistically significant, though, again, the effect size (0.28) is

important. The improvement in DEIS Band 2 schools, from 230 to 259, is statistically significant (effect size = .62). Consistent with this, just 27% of pupils in Band 2 schools performed at Level 1 or below in NA ’14, compared with 52% in DEIS Band 1 schools.

At Sixth class, pupils in Band 1 schools had a non-significant increase in overall mathematics from 219 in NA ’09 to 233 in NA 14. However, again, the associated effect size (0.29) can be considered important. At Band 2, an increase, from 231 to 241, did not reach statistical significance either, and the effect size was small (0.21). At Band 1, 50% of pupils performed at or below Level 1 in 2014, while at Band 2, 42% did so. The small improvements observed in urban DEIS schools are broadly consistent with those reported by Weir & Denner (2013), where, for example, there was a one score point improvement across Band 1 and Band 2 schools on mathematics on a scale with a national mean of 100 and a standard deviation of 15 (an effect size of about 0.06) for pupils who were in Third class in 2010 and Sixth in 2013.

The results for mathematics in DEIS urban schools indicate that there is scope for improvement. Indeed, with the exception of DEIS Band 2 schools in Second class, improvements in performance in both reading literacy and mathematics have only kept pace with those of pupils in schools in general, and performance is still below national standards. While the revised primary mathematics curriculum may help to improve performance in DEIS urban schools over time, it will be some years before it is fully implemented. In the meantime, not only in the context of the National Strategy, but also in terms of addressing the needs of the pupils concerned, it would seem important to focus intensively on improving mathematics standards in DEIS urban schools.

References

Cohen, J. (1988). *Statistical power analysis for the behavioural sciences* (2nd Ed.). Hillsdale, NJ: Erlbaum.

Cosgrove, J., & Cartwright, F. (2013). Changes in achievement on PISA: the case of Ireland and implications for international assessment practice. *Large-scale Assessments in Education, 2* (2). Accessed at: http://www.largescaleassessmentsineducation.com/content/2/1/2

DES (Department of Education and Science)/ NCCA (National Council for Curriculum and Assessment). (1999a). *Primary school curriculum. English language*. Dublin: Stationery Office.

DES/NCCA. (1999b). *Primary school curriculum. Mathematics content*. Dublin: Stationery Office.

DES. (2005). *DEIS: An action plan for educational inclusion*. Dublin: Author. Accessed at: http://www.education.ie/en/Publications/Policy-Reports/deis_action_plan_on_educational_inclusion.pdf

DES (Department of Education and Skills). (2010). *Better Literacy and Numeracy for Children and Young People: A Draft Plan to Improve Literacy and Numeracy in Schools*. Dublin: Author. Accessed at: https://www.education.ie/en/Schools-Colleges/Information/Literacy-and-Numeracy/Better-Literacy-and-Numeracy-for-Children-and-Young-People-A-Draft-National-Plan-to-Improve-Literacy-and-Numeracy-in-Schools-November-2010-.pdf

DES. (2011a). *Literacy and numeracy for learning and life: The National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-20.* Dublin: Author. Accessed at: http://www.education.ie/en/Schools-Colleges/Information/Literacy-and-Numeracy/Literacy-and-Numeracy-Learning-For-Life.pdf

DES. (2011b). *Circular 0056/2011. Initial steps in the implementation of the national literacy and numeracy strategy*. Dublin: Author. Accessed at: http://www.education.ie/en/Circulars-and-Forms/Active-Circulars/cl0056_2011.pdf

DES. (2012). *Circular 0025/2012. Implementation of the national literacy and numeracy strategy.* Dublin: Author. Accessed at: http://www.education.ie/en/Circulars-and-Forms/Active-Circulars/Implementation-of-the-National-Literacy-and-Numeracy-Strategy.pdf

Dooley, T., Dunphy, E., Shiel, G., Butler, D., Corcoran, D.. Farrell, T., Nic Mhuirí, S., O'Connor, M., Travers, J., & Perry, B. (2014). Mathematics in early childhood and primary education (3-8 years). Teaching and learning. Research report no. 18. Dublin: NCCA. Accessed at: http://ncca.ie/en/Publications/Reports/NCCA_Research_Report_18.pdf

ERC (Educational Research Centre). (2008). *Framework for the 2009 National Assessment of English Reading.* Dublin: Author. Accessed at: http://www.erc.ie/documents/maths_framework2009.pdf

ERC. (2009). *Framework and test specifications for the 2009 national assessment of mathematics. Second and sixth classes*. Accessed at: http://www.erc.ie/documents/maths_framework2009.pdf

Eivers, E., Shiel, G., Perkins, R., & Cosgrove, J. (2005). *The 2004 National Assessment of English Reading.* Dublin: Educational Research Centre. Accessed at: http://www.erc.ie/documents/naer04_report_full.pdf

Eivers, E., Close, S., Shiel, G., Millar, M., Clerkin, A., Gilleece, L. & Kiniry, J. (2010). *The 2009 National Assessments of Mathematics and English Reading.* Dublin: Educational Research Centre. Accessed at: http://www.erc.ie/documents/na2009_report.pdf

Eivers, E., Millar, D., Clerkin, A., & Close, S. (2010). *The 2009 National Assessments. Technical report*. Dublin: Educational Research Centre. Accessed at: http://www.erc.ie/documents/na2009_technical_report.pdf

Gilleece, L., Shiel, G., Clerkin, A., & Millar, D. (2012). *The 2010 National Assessments of English reading and mathematics in Irish-medium schools. Main report. /Measúnachtaí Náisiúnta 2010 ar léitheoireacht Bhéarla agus ar mhatamaitic i scoileanna a bhíonn ag teagasc trí mheán na Gaeilge. Prómohthuarascáil.* Dublin: Educational Research Centre. Accessed at: http://www.erc.ie/documents/naims_mainreport.pdf

Kennedy, E., Dunphy, E., Dwyer, B., Hayes, G., McPhillips, T., Marsh, J., O'Connor, M., & Shiel, G. (2012). *Literacy in early childhood and primary education (3-8 years).* Dublin: National Council for Curriculum and Assessment. Accessed at: http://www.ncca.ie/en/Publications/Reports/Literacy_in_Early_Childhood_and_Primary_Education_3-8_years.pdf

LaRoche, S., & Cartwright, F. (2010). Independent review of the PISA 2009 results for Ireland. Dublin: Educational Research Centre. Accessed at: http://www.erc.ie/documents/statscan_pisa00to09_final_report.pdf

Merriman, B., Shiel, G., Cosgrove, J., & Perkins, R. (2014). *Project Maths and PISA 2012: Performance in Initial Project Maths schools and in Non-initial schools on PISA 2012 Mathematics and Problem-solving and on Junior Certificate mathematics*. Dublin: Educational Research Centre.

Mulrooney, V.J. (1986). National surveys of reading attainment in primary schools in Ireland. In V. Greaney (Ed.), *Irish papers presented at the Fourth European Reading Congress and Tenth RAI Annual Conference* (pp. 187-200). Dublin: Reading Association of Ireland.

Perkins, R., Cosgrove, J., Moran, G., & Shiel, G. (2010). *PISA 2009: The performance and progress of 15-year olds in Ireland. Summary report*. Dublin: Educational Research Centre. Accessed at: http://www.erc.ie/documents/p09national_summary_report2009.pdf

Perkins, R., Cosgrove, J., Moran, G., & Shiel, G. (2012). *PISA 2009: Results for Ireland and changes since 200*0. Dublin: Educational Research Centre. Accessed at: http://www.erc.ie/documents/pisa2009main_nationalreport.pdf

PDST. (Professional Development Service for Teachers). (2013). Shape and space manual. Dublin: Author. http://www.pdst.ie/sites/default/files/S&S%20manual_22.11.13.pdf

Shiel, G., Cregan, A., McGough, A., & Archer, P. (2012). *Oral language in early childhood and primary education (3-8 years). Research report no. 14*. Dublin: National Council for Curriculum and Assessment. Accessed at: http://www.ncca.ie/en/Publications/Reports/Oral_Language_in_Early_Childhood_and_Primary_Education_3-8_years_.pdf

SEC (State Examinations Commission). (2014). Junior Certificate 2014. Provisional gender statistics. Accessed at: https://www.examinations.ie/index.php?l=en&mc=st&sc=r14

Shiel, G., Surgenor, P., Close, S., & Millar, D. (2006). *The 2004 National Assessment of Mathematics Achievement*. Dublin: Educational Research Centre. Accessed at: http://www.erc.ie/documents/nama04_main_report_complete.pdf

Weir, S. (2011). *A report on the first phase of the evaluation of DEIS. Summary report.* Dublin: Educational Research Centre. Accessed at: http://www.erc.ie/documents/deis_p1_summary.pdf

Weir, S., & Denner, S. (2013). *The evaluation of the School Support Programme under DEIS: Changes in pupil achievement in urban primary schools between 2007 and 2013*. Dublin: Educational Research Centre. Accessed at: https://www.into.ie/ROI/NewsEvents/LatestNews/Downloads/deis2013_bulletinreport.pdf

Weir, S., & McAvinue, L. (2013). *The achievements and characteristics of pupils attending rural schools participating in DEIS*. Dublin: Educational Research Centre. Accessed at: http://www.erc.ie/documents/rural_report2013.pdf

What Works Clearinghouse. (2014). *Procedures and standards handbook. Version 3.0.* Washington: US Department of Education, Institution of Educational Sciences. Accessed at: http://ies.ed.gov/ncee/wwc/pdf/reference_resources/wwc_procedures_v3_0_standards_handbook.pdf

www.erc.ie/NA2014

ISBN: 978 0 900440 46 5