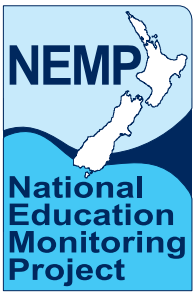

NEW ZEALAND

NEMP
Writing, Reading and Mathematics Report 2010

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MINISTRY OF EDUCATION
Te Tāhuhu o te Mātauranga

NEMP REPORTS					
CYCLE 1	1995	1	Science	CYCLE 2	1999	13	Science
		2	Art			14	Art
		3	Graphs, Tables and Maps			15	Graphs, Tables and Maps
						16	Māori Students' Results
	1996	4	Music		2000	17	Music
		5	Aspects of Technology			18	Aspects of Technology
		6	Reading and Speaking			19	Reading and Speaking
						20	Māori Students' Results
	1997	7	Information Skills		2001	21	Information Skills
		8	Social Studies			22	Social Studies
		9	Mathematics			23	Mathematics
						24	Māori Students' Results
	1998	10	Listening and Viewing		2002	25	Listening and Viewing
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Note that reports were published the year after the research was undertaken.

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND

NATIONAL EDUCATION MONITORING REPORT 53
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1: Executive Summary

In 2010 the National Education Monitoring Project (NEMP) examined what a nationally representative sample of New Zealand students in year 4 and year 8 know and can do in writing, reading and mathematics, and their perceptions of these areas of the curriculum.

The 'light sampling' approach (sampling of students and assessment tasks) means that different groups of students answered different sets of tasks. Group A focused mainly on writing, Group B focused mainly on reading and Group C focused mainly on mathematics.

In each area of the curriculum, questions and tasks were clustered conceptually to form several dimensions of interest. In writing, for example, the dimensions of interest (clusters) were surface features, deep features and demonstrating understanding. The cluster scores and total scores formed the basis of reporting on students' achievement.

The growth in achievement between year 4 and year 8 was measured using the assessment task components that were in common. As 2010 was the normal four-year cycle for writing, trends in achievement since 2006 are reported.

Effect sizes were used to examine differences between demographic subgroups of students' overall performance. The eight demographic variables included gender, ethnicity and whether English or another language was used at home, school type, school size, zone, community size and socio-economic index.

Students' attitudes to and opportunities for writing, reading or mathematics were examined through a number of open-ended and rating questions. Correlational analyses were undertaken to explore the relationship between achievement and attitudes and opportunities. Trends in perceptions since 1998 were examined for attitudinal questions for writing, reading and mathematics.

This section sets out the major findings for writing, reading and mathematics in turn.

Writing

Writing is a component of the English learning area of the curriculum.

Overview

Student performance in writing shows a fairly consistent pattern of achievement from previous administrations of NEMP writing, with higher performance on tasks and aspects of tasks related to surface features of writing than on the deep features of writing. However, we also see that growth in performance from year 4 to year 8 is stronger on the deep features. Students generally enjoy writing, and enjoy writing stories and poems more than subject-related or other non-fiction writing. Preference for writing and self-perception of writing abilities decline from year 4 to year 8, patterns similar to previous administrations.

Achievement

Achievement in writing was examined in relation to three dimensions: surface features - the conventions of spelling, punctuation and grammar; deep features - the use of appropriate language features, tone and vocabulary in relation to purpose and audience; and demonstrating understanding - an understanding of the skills and knowledge required to write effectively.

Both year 4 and year 8 students performed better on the tasks related to surface features of writing than on deep features, or demonstrating understanding. The median cluster scores were approximately 56 percent, 26 percent and 14 percent for year 4 compared to 63 percent, 48 percent and 29 percent for year 8.

There is clear growth in writing skills between year 4 and year 8.

Trends from 2006 to 2010

Overall, there has been no real change in performance at either the year 4 or year 8 level since 2006 on the 16 trend tasks. The average effect sizes for the differences between 2010 and 2006 were -.08 and .06 for year 4 and year 8 respectively. However, in some aspects of persuasive, descriptive and letter writing, year 8 students, particularly those at the lower end of the score range, have shown an improvement in achievement.

Attitudes

Writing is the fourth most popular of 14 subjects for year 4 and the eighth most popular subject for year 8 students.

For year 4 students, the preferred writing activity was writing stories (as it has been since 1998) and for year 8 students it was writing text messages, emails, blogs or tweets. This overshadows the popularity of all other writing activities.

Year 8 students placed greater emphasis than year 4 students on 'using their imagination' and 'liking writing' as things needed by good writers, rather than 'writing neatly' or 'writing lots'. The large majority of year 8 students used the computer to write emails/messages to others such as blogs and tweets.

Since 1998 there has been an increasing awareness amongst both year 4 and year 8 students that using their imagination is important for being good writers. For year 8 students, this awareness extended also to being willing to try things out, to go back and check their work, to read a lot and, to a lesser extent, to talk about their work with others.

Students at both levels thought they needed to get better at punctuation, understanding mechanics/grammar, spelling and editing/checking.

Year 4 students are slightly more positive than year 8 students in terms of how good they think they are at writing and much more positive in terms of how much they like writing. Year 4 students tend to share their writing with others more often than year 8 students. Both year levels report similar opportunities for using computers for writing.

Students are receiving more feedback from teachers about their writing than in previous surveys and are therefore likely to be better informed about their own achievement in writing.

Relationship between achievement and attitudes

For year 8 students there was a statistically significant relationship between writing achievement and a number of affective aspects of writing. Their achievement was significantly positively related to how much they like writing, their perception of how good they are, and how good their teacher and their parents think they are in writing.

Differences between demographic subgroups

For both year levels, there were substantial differences between the overall performances by gender, ethnicity, language spoken at home and school decile. At year 4, geographic region and size of school were important factors. Size of community showed no differences in performance at either year level.

Overall, girls scored higher than boys, 'Pākehā and other' students scored higher than Māori and Pasifika students, students in high-decile schools performed better than those in low-decile schools, and students who speak English at home performed better than those who speak another language.

In addition, on average, at year 4 Māori students score higher than Pasifika students, students in the Auckland region perform better than students in the South Island, and students in large schools perform better than those in small and medium–sized schools. At year 8 students in high-decile schools perform better than those in medium-decile schools.

Reading

Reading is a component of the English learning area of the curriculum.

Overview

Student performance in reading is characterised by wide variability in performance at both year 4 and year 8 and moderate growth across those years. On tasks common to year 4 and year 8 students, the largest gains were seen on vocabulary tasks and oral reading, with smaller gains seen in literal and deep comprehension. Students enjoy reading at school and a large majority believe that they are good readers. Over 80 percent of students at year 4 and 66 percent of students at year 8 enjoy reading at home.

Achievement

Achievement in reading was examined in relation to four dimensions: oral reading/decoding – the ability to decode and give meaning to the symbolic representations of sounds that are constructed into words; vocabulary – knowledge of word meanings; literal comprehension – the ability to extract information from text; and comprehension of deeper features – the ability to make inferences and interpret underlying meanings in texts.

Year 4 and year 8 students are better at oral reading/decoding and literal comprehension tasks than vocabulary tasks. They are weakest on deep comprehension tasks.

Growth from year 4 to year 8

Students' performances on tasks common to both year levels were compared. Year 8 students performed about 20 percentage points higher than year 4 students on each dimension and overall.

Attitudes

Reading was the third most popular subject for year 4 students and the fifth most popular for year 8 students. It has become more popular for year 4 students since 1998 but has remained the same for year 8 students.

The favourite reading activity in school at both year levels was silent reading. The popularity of listening to the teacher reading, while still relatively high, has steadily declined since 1998. A relatively popular activity for both year levels was reading with a buddy or partner, and for year 8 students, looking at/browsing through books.

Students were asked what they thought was necessary to be a good reader. Year 4 students tended to think about reading as a technical task requiring learning hard words and, to a lesser extent, sounding out words, going back and trying again. In contrast, year 8 students placed greater emphasis on enjoying reading, reading a lot and thinking about what they read.

Approximately 85–90 percent of students felt positive about how well they read.

Students were positive about almost all aspects of reading, particularly about their own competence in reading, liking reading at school, having their teacher read a story out loud, the books they read as part of their reading programme at school, how good their teacher and parents think they are at reading, getting a book for a present, how much they like going to the library, looking at books in a bookshop, and reading in their own time. The views of year 4 students were expressed more strongly than those of year 8.

Relationship between achievement and attitudes

Year 8 student reading achievement correlated significantly with how much they like reading, how good they (and their teacher and parents) think they are at reading, how much they like reading in their own time, getting a book for a present, and looking at books in a bookshop.

Their performance is also strongly related to how they feel about a number of classroom reading activities, such as how well they read, reading aloud in a group, to the teacher or to the class.

Year 4 student reading achievement is significantly positively related to how good they think they are at reading, but inversely to how often their teacher gives them feedback about their reading, and how much they like the choice of books in their reading programme. Students achieving poorly in reading tend to receive more feedback from their teacher, and like the books they are asked to read less.

Differences between demographic subgroups

For both year levels, there were substantial differences between the overall performances for ethnicity and school decile.

At year 4 and year 8 ‘Pākehā and other’ students score higher than Māori students and Pasifika students, Māori students perform higher than Pasifika students, and students in high-decile schools perform better than those in medium and low-decile schools.

In addition, year 4 students in medium-decile schools perform better than those in low-decile schools.

Mathematics

Mathematics is a learning area of the curriculum.

Overview

Student performance in mathematics shows wide variability in achievement in both number and algebra, and geometry and measurement at both year 4 and year 8. On tasks common to year 4 and year 8, we see substantial growth in performance in both number and geometry of about 33 percent. Students enjoy maths; it is the second highest rated subject area in year 4 and third highest in year 8. There is generally a decline in the enjoyment of maths from year 4 to year 8. Although 86 percent of year 4 students like maths compared with 73 percent of year 8 students, year 4 students like it ‘heaps’ compared with 23 percent of year 8 students.

Achievement

Achievement in mathematics was examined in relation to three dimensions: number and algebra, geometry and measurement, and statistics.

The median percentage scores for year 4 students on the number and algebra dimension was 58 percent, similar to their performance on the geometry and measurement dimension (57%). Year 4 students did not answer statistics tasks.

The median percentage correct scores for year 8 students on the number and algebra dimension was 75 percent, similar to their performance on the geometry and measurement dimension (74%). For statistics, the median percentage correct score was 59 percent.

Growth from year 4 to year 8

On the same set of tasks, year 8 students' median scores were approximately 33 percent points higher than those for year 4 on both dimensions: number and algebra, and geometry and measurement. Over the two dimensions, the median year 8 score was 84 percent compared to 52 percent for year 4.

Attitudes

Students at both year levels enjoyed a range of maths activities. The most popular activity for year 4 students involved doing maths worksheets and for year 8 students it involved doing maths problems and puzzles.

Students were asked what they thought was necessary to be good at mathematics. Basic facts and tables were seen by a clear majority of students at both year levels to be important, followed by mathematics knowledge for year 8 students and work skills for year 4 students. Since 2005, these activities have been increasingly recognised as being important.

Both year 4 and year 8 students named basic facts and tables, and then activities involving puzzles, quizzes and games as being interesting maths activities to do in their own time.

In general, both year 4 and year 8 students are relatively positive about how good they are at maths, how much they like maths and being engaged in maths activities, although year 8 students' views were less positive overall than those for year 4. A notable difference between the two year levels is the much greater proportion of year 8 students whose attitudes are strongly negative, particularly for how much they like doing maths at home (33% compared with 16%).

Year 4 students are generally very positive about mathematics. More than a third would like to do more mathematics at school, 86 percent like it 'heaps' or 'a lot', and 89 percent believe they are good at it, compared to their teacher (73%) and their parents (85%). Approximately 80 percent of year 4 students enjoy a range of maths activities at school and at home.

The views of year 8 students were also generally positive but less so than year 4 students. Corresponding figures for the above aspects of mathematics are: only 14 percent would like to do more maths, 73 percent like it 'heaps' or 'a lot', and 77 percent believe they are good at it, compared to their teacher (61%) and their parents (76%); 77 percent enjoy a range of maths activities at school and at home.

These patterns have been relatively stable since 2000, except for the proportion of year 8 students who 'don't know' how good their teacher thinks they are at maths (which has dropped from 33% in 2000 to 23% in 2010) and their parents (which has dropped from 25% to 11%).

Relationship between achievement and attitudes

Year 8 student mathematics achievement is significantly positively related to how much they like maths, how good they think they are at maths (and how good they say their teacher and parents think they are), how much they like doing maths in their own time, and how they feel about doing things in maths that they haven't done before.

At year 4, the relationship between achievement and student perceptions of mathematics was substantially weaker than those for year 8. The only statistically significant positive relationship was found for how good they think they are at maths.

Differences between demographic subgroups

For both year levels, there were substantial differences between the overall performances for ethnicity, school decile and language at home. For year 4 students, school size was also an important factor.

At year 4 and year 8: 'Pākehā and other' students score higher than Māori students and Pasifika students, students in high-decile schools perform better than those in medium and low-decile schools, students in medium-decile schools perform better than those in low-decile schools, and students who speak English at home perform significantly better than students who speak other languages in the home.

In addition, year 4 students in large schools performed substantially better than those in small schools and year 8 Māori students performed higher than Pasifika students.

Summary

The findings overall indicate that there is growth between year 4 and year 8 in achievement in writing, reading and particularly mathematics. There is no real change in the level of writing between 2006 and 2010. Year 4 students tend to be more positive than year 8 students about each area of the curriculum and this was reflected in the rankings of favourite areas of the curriculum. It was particularly noticeable in mathematics that a large proportion of year 8 students held negative views of mathematics.

The relationship between achievement and attitudes was substantially stronger for year 8 students than for year 4 students. In the main, high achievement is significantly positively related to how much students like the particular learning area, how good they think they are at it, and how good their teacher or parents think they are at it.

'Pākehā and other' students tended to perform better than Māori and Pasifika students in each area of the curriculum. Students in high-decile schools tended to perform better than students in medium and low-decile schools. Speaking English at home was a significant factor in how students achieved in writing and mathematics. The only significant gender difference was found for writing where girls performed better than boys.

2: Method

2.1 National Education Monitoring Project (NEMP)

Purpose

National monitoring aims to address the New Zealand Curriculum that emphasises seven essential learning areas, eight essential skills and a variety of attitudes and values. Table 1 below illustrates the four cycles of national monitoring since 1995, the years included in each cycle and the groupings of essential learning areas. The cycle of reports produced during this period are listed opposite the contents page of this report.

In 2010 there was a variation in the cycle to include a modified assessment of reading and mathematics with the normal cyclic assessment of writing in which trends in what students know and can do since 2006 were monitored. This meant approximately 45 percent of the writing tasks were kept constant from 2006 allowing trends in achievement across the four–year interval to be observed and reported. As reading had been last assessed two years ago in 2008 and mathematics had been assessed the previous year in 2009, the study did not seek to monitor change in student achievement. Rather, sets of tasks used previously were re-used in 2010. These tasks were linking tasks that will be retained for future national monitoring.

Table 1 NEMP curriculum cycles

Cycle 1	Cycle 2	Cycle 3	Cycle 4	NEW ZEALAND CURRICULUM		
1995	1999	2003	2007	- Science - Visual Arts - Information Skills: Graphs, Tables and Maps	Communication skills Problem-solving skills Self-management and competitive skills Social and cooperative skills Work and study skills	Attitudes
1996	2000	2004	2008	- Language: Reading and Speaking - Aspects of Technology - Music		
1997	2001	2005	2009	- Mathematics and Statistics - Social Studies - Information Skills for Inquiry Learning		
1998	2002	2006		- Language: Writing, Listening and Viewing - Health and Physical Education		
			2010	- Reading - Writing - Mathematics and Statistics		

Sampling procedures

National monitoring information was gathered using representative samples of students. In contrast to previous NEMP sampling procedures, only schools that contained at least 18 students at either year 4 or year 8 were included in the sampling frame. Schools involved in other ministry projects related to the implementation of National Standards were not invited to participate in NEMP.

The nationally representative sample comprised 80 schools at the year 4 level, and 80 schools at the year 8 level. From each school, 18 students were selected to participate.

The above restrictions operating within the population of schools from which the samples were selected was not considered to have serious consequences for the representativeness of achievement nationally. Previous NEMP studies have reported no substantive differences in the performance of students from very small schools. The samples of 1440 year 4 students and 1422 year 8 students in 2010 represented approximately five percent of the students at those levels; large enough samples to give a trustworthy national picture of student performance. See Appendix A for details of the composition of the samples by gender, ethnicity, main language at home, region, geographic zone, community size, and school socio-economic status, size and type of school.

The students selected in the sample at each year level were randomly divided into three groups (A, B and C), each comprising six students. Each group attempted one third of the tasks. The distribution of tasks within each of the curriculum areas differed from previous NEMP years because of the need to optimise the individual student level achievement data within each area of the curriculum, and to also contribute to the requirements for the related linking study. Hence, Group A students focused primarily on writing tasks, Group B focused primarily on reading tasks, and Group C focused primarily on mathematics tasks. To retain student interest and motivation, and to balance the practical requirements of conducting a complex array of tasks to different groups of students each group of students also answered a small number of tasks in the other two areas of the curriculum. A full description of the number of tasks undertaken by each group is detailed in the sections that follow.

Conducting the assessments

The assessments were carried out over a five-week period for each year level. The year 8 assessments occurred in August/September 2010 followed by year 4 assessments in October/November 2010. Each student participated in up to four hours of assessment activities spread over one week. This included one hour of classroom testing for the linking study.

The assessments were conducted by experienced teachers, usually working in their own region of New Zealand. They were selected from a national pool of applicants and attended specialist training led by senior Project staff. They worked in pairs to conduct assessments of 90 children over five weeks.

Assessment task design and administration

Assessment procedures were designed to provide a rich picture of what students know and can do.

The choice of tasks for national monitoring was guided by a number of educational and practical considerations. Tasks were chosen because they were considered to be a valid assessment, provided a good representation of important dimensions of the areas being assessed and met a number of requirements in regard to administration and presentation. For example:

- Each task, with its associated materials, needed to be structured to ensure a high level of consistency in the way it was presented by specially trained teacher administrators to students of wide ranging backgrounds and abilities, and in diverse settings throughout New Zealand.
- Tasks needed to span the expected range of capabilities of year 4 and 8 students and allow the most able students to show the extent of their abilities while also giving the least able the opportunity to show what they can do.
- Materials for tasks needed to be sufficiently portable, economical, safe and within the handling capabilities of students. Resources needed to have meaning for students.
- The time needed for completing an individual task had to be balanced against the total time available for all of the assessment tasks, without denying students sufficient opportunity to demonstrate their capabilities.
- Each task needed to be capable of sustaining the attention and effort of students in order to produce responses that truly indicated what they know and can do. Since neither the student nor the school received feedback on performance, the motivational potential of the assessment was critical.
- Tasks needed to avoid unnecessary bias on the grounds of gender, culture or social background, while accepting that it was appropriate to have tasks that reflect the interests of particular groups within the community.

There were a number of considerations in the task design and administration to ensure appropriate support for students. Tasks were often presented and responded to orally and teacher administrators were able to help students understand and respond to written tasks if reading and writing were not the areas being assessed in the task.

In 2010, three task approaches were used for national monitoring. Each student spent up to an hour working in each format. The three approaches were:

- *One-to-one interview* – Each student worked individually with a teacher, with the whole session recorded on videotape.
- *Stations* – Six students worked independently, moving around a series of 'hands-on' stations. Students recorded responses on paper or computer.
- *Independent* – The students worked individually on paper-and-pencil tasks.

Marking and analysis

All student responses were marked and analysed at the conclusion of data collection. The marking process included extensive discussion of initial examples and careful checks of the consistency of marking. Tasks which could be marked objectively, or with modest amounts of professional experience, were marked by teacher education students in November/December 2010. Tasks that required higher levels of professional judgment were marked by teachers, selected from throughout New Zealand, in January 2011.

The students' responses were assessed using specially designed marking procedures. The criteria used had been developed in advance by Project staff, but were sometimes modified as a result of issues raised during marking. Where tasks required marker judgment, the responses from year 4 and year 8 students were intermingled during marking sessions, with the goal of ensuring that the same marking criteria and standards were used for both. In the case of writing, if these tasks were trend tasks, substantial representative samples of the responses of year 4 and year 8 students assessed in the previous cycle were also intermingled into the marking process, to help ensure that all comparisons were based on the same marking criteria and standards.

Although the emphasis is on the overall national picture, some attention was also given to possible differences in performance patterns for different demographic groups and categories of school. The variables considered were:

- Student gender:
  – male
  – female
- Student ethnicity:
  – Māori
  – Pasifika
  – Pākehā and other
- Home language:
  (predominant language spoken at home)
  – English
  – any other language
- Geographical zone:
  – greater Auckland
  – other North Island
  – South Island
- Size of community:
  – main centre over 100,000
  – provincial city of 10,000 to 100,000
  – rural area or town of less than 10,000
- Socio-economic index for the school:
  – deciles 1 to 3
  – deciles 4 to
  – deciles 8 to 10
- Size of school:
  year 4 schools
  – fewer than 25 year-4 students
  – 25 to 60 year-4 students
  – more than 60 year-4 students

  year 8 schools
  – fewer than 35 year-8 students
  – 35 to 150 year-8 students
  – more than 150 year-8 students
- Type of school
  (for year 8 sample only):
  – full primary school
  – intermediate school
  – year 7–13 high school
  (some students were in other types of schools, but too few to allow separate analysis).

The skills assessed across the tasks within each area of the curriculum were clustered conceptually. The conceptual clusters were then verified statistically by examining the inter-correlations of the cluster scores and their respective components and by factor analysis. For example, writing skills were clustered into the dimensions of 'deep features', 'surface features' and 'demonstrating understanding'.

Attitudinal rating questions for each area of the curriculum were factor analysed to identify three to five affective dimensions. For example, in writing, the affective dimensions were 'perception of competence', 'attitude towards writing', 'opportunities for sharing written work', and 'use of the computer for writing'.

2.2 Reporting of findings

Reporting procedures were designed to provide a clear picture of the overall patterns of findings relating to achievement and attitudes, and a rich picture of what students know, can do and think. The result is a detailed national picture of student achievement and attitudes, and the relationship between them.

The findings of students' achievement in writing, reading and mathematics are reported in the following ways:

1. Achievement and attitudes in 2010.
   Tasks were grouped to form several clusters of related skills/attributes. The clustering was done conceptually by Project staff and used to report findings. (The conceptual clustering of tasks was examined statistically and is reported in Appendix C.) The cluster scores were used to report how students nationally achieved. A total score across clusters was used to examine possible differences in sub-populations, and to examine the relationship between students' achievement in an area of the curriculum and their attitudes to that area of the curriculum. The number of tasks in writing, reading and mathematics responded to by each group of students are in Table 2.

   Table 2 Number of tasks per curriculum area

	Writing	Reading	Mathematics
A	**13**	3	14
B	9	**13**	4
C	11	1	**21**
Total:	**33**	**17**	**39**

   In each area of the curriculum, there was one 'focus' group that took primarily tasks in that area and also answered the corresponding attitudinal survey. For writing the focus group was A; for reading the focus group was B; and for mathematics the focus group was C. As the patterns of findings were similar for each group of tasks within each area, the findings for the focus groups are reported.

2. Trends in writing achievement and attitudes towards writing since 2006 were examined for the tasks and questions in common across the two cycles of assessment. Differences in achievement over the four-year period were examined using effect sizes. Where the effect sizes were substantial (>.30) the tasks were examined in greater detail by examining differences in achievement on individual marking criteria.
3. Student performance on one task in each area is presented in full to illustrate the nature of instructions, questions and marking criteria used. These tasks may be useful for teachers to use with their students.

3: Writing

3.1 What is writing?

This report presents details and results of the assessments of students' skills, knowledge, perceptions and attitudes in aspects of the writing component of English in the New Zealand Curriculum. The National Monitoring Writing Framework, developed and revised by the Project's advisory panel, provided a structure for the development of the tasks. National Standards in writing and the Literacy Progressions were considered in the design of tasks.

The framework for writing has a central organising theme supported by three inter-related aspects (Table 3). The understandings aspect of the framework summarises important ideas about the actions, impact and consequences of ways in which messages might be created, shaped, communicated, interpreted and used. The purposes aspect identifies some of the major contexts in which writing is applied. The skills aspect lists key abilities that students could be expected to demonstrate while engaging in writing for particular purposes. The importance of attitudes and motivation is also highlighted.

Table 3 NEMP writing framework 2010

NEMP WRITING FRAMEWORK 2010

Central organising theme

Creating, constructing and communicating meaning in written forms for various purposes and audiences

Understandings

- Writing is used for a variety of purposes, and uses a range of media
- Purposes and audiences influence form and style
- Written language differs in structure and style from spoken language
- Writing is a cyclic process of thinking, drafting and reworking
- Conventions of writing are required for effective communication
- Writing is a creative process enriched by personal experiences, understandings and insights
- Writing proficiency is supported through rich learning experiences and dialogue
- Writing proficiency is aided by a responsive and critical audience
- Writing proficiency is enhanced through using language appropriate to purpose and task

Key Purposes

To inform, entertain, reflect, enquire and persuade

through:

- Story telling
- Exploring thoughts and ideas
- Expressing feelings
- Expressing opinions
- Retelling
- Entertaining
- Describing
- Explaining
- Directing
- Questioning
- Requesting
- Recording
- Reporting
- Letter writing
- Form filling
- Note taking
- Summarising

Skills

Planning

- Establishing a purpose
- Choosing a topic and generating ideas
- Identifying an audience
- Selecting suitable formats and text structures

Composing & drafting

- Selecting, developing and organising ideas
- Structuring ideas appropriately (e.g. in sentences and paragraphs) according to purpose
- Using appropriate language features and text structures
- Selecting and using appropriate words, symbols, images
- Drafting and revising content in relation to the writing purpose
- Deciding on headings

Checking

- Clarity
- Appropriateness
- Conventions of spelling, punctuation, grammar

Presenting

- Layout
- Handwriting

Motivation

• Enthusiasm for writing • Voluntary engagement in writing • Commitment to being a good writer • Having a purpose to write

3.2 Conceptual analysis of writing

For the purposes of reporting student achievement, tasks were allocated to clusters based on key elements of writing identified in English in the New Zealand Curriculum, the National Standards for writing and the Literacy Learning Progressions. The conceptual analysis of writing resulted in three clusters being identified:

Surface features: the conventions of spelling, punctuation and grammar.

Deep features: the use of appropriate language features, tone and vocabulary in relation to purpose and audience.

Demonstrating understanding: an understanding of the skills and knowledge required to write effectively.

The number of tasks answered by different groups of students is summarised in Table 4. The proportion of one-to-one interview tasks to paper-and-pencil tasks in each group was approximately 1:3.

Table 4 Number of tasks in Groups A, B and C assessing each dimension of writing

Group	Surface Features	Deep Features	Demonstrating Understanding	Total
A	5 (includes two Y8 only tasks)	6 (includes one Y8 only task)	2	13
B	3 (includes one Y8 only task and one Y4 only task)	6 (includes one Y8 only task)	1	9
C	3 (includes one Y8 only task and one Y4 only task)	8	1	11
Total:	**11**	**20**	**4**	**33**

Note. Individual tasks contributed to more than one cluster score e.g. some tasks assessed both surface and deep feature.

Some tasks were marked for both surface and deep features. These have been described in the table below as components and as a result there are more components than tasks.

3.3 Findings for writing 2010

Cluster analyses

The performance of year 4 and 8 students on each cluster (surface features, deep features and demonstrating understanding) is displayed in Figure 1 for the focus group – Group A.

The vertical axis represents the cluster score expressed as a percent. This allows us to compare the relative performance of students across clusters as the total possible score in each cluster varies. The shaded box represents the middle 50 percent of the cluster scores (between the 25th percentile and the 75th percentile). Where there is only one shaded section to the box it means that the 50th percentile is the same score as the 25th percentile. The whisker represents the range between the top and bottom percent scores. The horizontal axis indicates the cluster and, in brackets, the number of score points in the cluster score. For example, there was a total possible score of 87 for the surface features cluster at year 4, a total possible score for deep features of 69, and 7 for demonstrating understanding.

Year 4 and year 8 students differed slightly in the number of tasks they responded to and/or the number of questions within some tasks, as parallel tasks with additional questions were used to extend year 8 students. Figure 1 is useful for comparing the relative performance of year 4 students on each cluster and similarly for year 8. To enable direct comparisons across year 4 and year 8, cluster scores computed on those items and tasks that were in common to both year levels are reported in Figure 2.

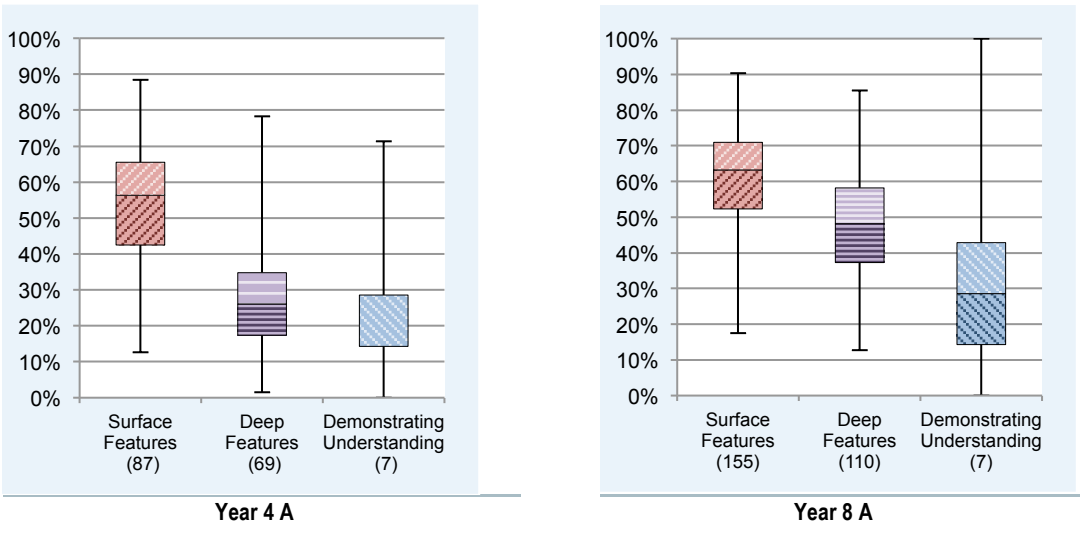


Figure 1 Percent scores on writing clusters for the year 4 and year 8 focus groups 2010

The graphs show that year 4 students tended to score much higher on surface features than deep features (medians are 48% and 27% respectively). The median score on demonstrating understanding was approximately 15 percent, although there were few tasks in this cluster.

A somewhat similar pattern was found for year 8 students with the average medians being 60 percent and 51 percent respectively. The median score on demonstrating understanding was approximately 27 percent.

Growth from year 4 to year 8

Growth in achievement between year 4 and year 8 was measured by comparing the two groups on the tasks/questions they answered in common (Figure 2).

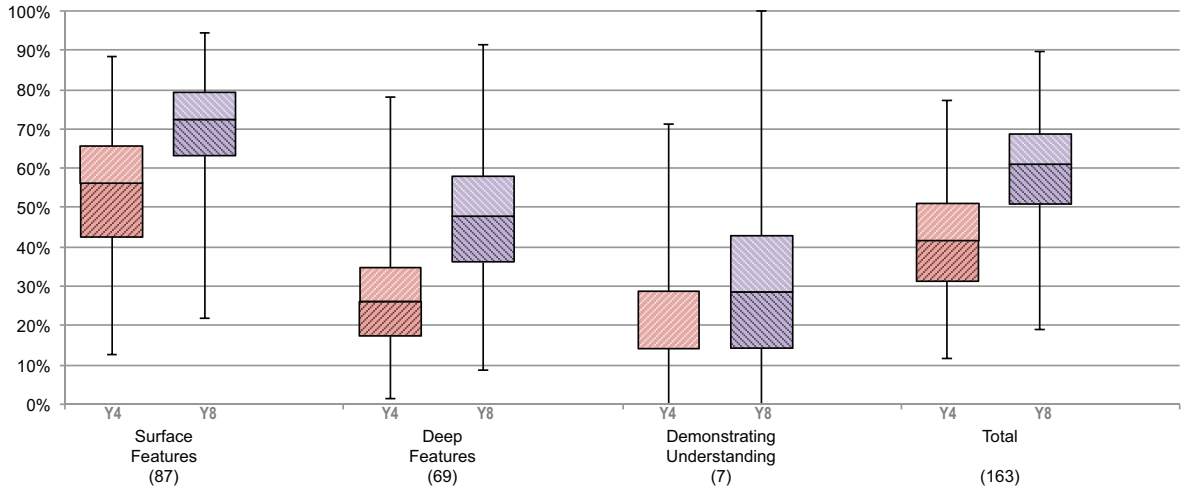


Figure 2 Growth in percent scores for writing clusters from year 4 to year 8 in 2010

There is a clear improvement in the level of performance on the three dimensions of writing. The median score difference of approximately 20 percent between year 4 and year 8 was consistent across all three clusters. For surface features, year 8 students scored 16 percent higher than year 4 students (72% cf 56%); for deep features, year 8 students scored 22 percent higher (48% cf 26%); and for demonstrating understanding 14 percent higher (28% cf 14%). The spread of scores was relatively similar for year 4 and year 8 across all clusters. This pattern is reflected in the difference on the total writing scores with the median for year 4 being 42 percent and for year 8 being 61 percent.

3.4 Trends from 2006 to 2010

This section reports on the trends in writing achievement for year 4 and year 8 students since 2006. Sixteen tasks were administered in both years; 11 tasks were answered by both year 4 and year 8; two tasks by year 4 only; and three tasks by year 8 only. The differences in performance on trend tasks between 2006 and 2010 are examined in two ways. The growth between year 4 and year 8 on each task is examined initially by comparing the mean and variance of total task scores and then those tasks which showed a substantial change in student performance (i.e. showed an effect size greater than 0.30) were explored in greater depth by examining the patterns of student responses to individual questions in order to identify the source of the difference.

Differences in performance on trend tasks between 2010 and 2006

To examine the differences in the mean performance of year 4 and year 8 students between 2010 and 2006, effect sizes were calculated for the total task score. Effect sizes > 0.30 are considered to show a substantial difference (Table 5).

Overall, there has been no real change in performance at year 4 or year 8 over time. The average effect sizes were -0.08 and 0.06 for year 4 and year 8 respectively.

There were several tasks where there was a substantial change, however. For example, at year 4, students in 2006 performed substantially better than those in 2010 on the 'Wolf' (descriptive writing) and 'Principal's Message' (expressing an opinion) tasks. At year 8, students in 2010 performed substantially better than those in 2006 on the 'Get Well Card' (expressive writing) and the 'My Fabulous Toothbrush' (persuasive descriptive writing) tasks, and less well on 'Wolf'.

Table 5 Effect sizes of differences between mean scores on writing trend tasks for year 4 and year 8 students in 2010 and 2006

YEAR 4	2010		2006		Effect Size	SE(ES)*
	Mean	SD	Mean	SD		
7: Spell Help	2.35	1.16	2.34	1.13	0.01	0.11
9: Wasp Nest	6.84	4.36	6.59	3.93	0.06	0.10
10: Spell-Write	18.73	7.58	19.99	7.63	-0.16	0.10
13: Get Well Card	2.55	1.49	2.35	1.49	0.13	0.10
17: Going Skating	3.76	1.44	3.46	1.46	0.20	0.10
20: Wolf	1.99	1.60	2.80	1.67	**-0.49**	0.10
21: My Fabulous Toothbrush	1.22	1.09	1.21	1.06	0.00	0.10
30: Principal's Message	3.45	2.48	4.22	2.29	**-0.31**	0.11
32: Best Friend	1.76	1.43	1.90	1.48	-0.10	0.11
33: Animal Antics	7.91	2.96	8.47	2.23	-0.19	0.11
34: Aloha Hawaii!	5.03	1.83	5.08	1.77	-0.03	0.11
37: Zoo Trip	7.77	4.25	7.58	4.28	0.04	0.11
38: Sentence Punctuation	11.52	5.97	12.46	5.77	-0.15	0.11
Average					-0.08	

YEAR 8	2010		2006		Effect Size	SE(ES)*
	Mean	SD	Mean	SD		
7: Spell Help	2.75	1.21	2.83	1.26	-0.07	0.11
9: Wasp Nest	14.30	6.42	14.39	5.46	-0.01	0.11
10: Spell-Write	25.00	3.87	24.50	4.75	0.12	0.11
13: Get Well Card	4.40	1.54	3.80	1.70	**0.37**	0.11
17: Going Skating	4.74	1.65	4.81	1.67	-0.05	0.10
18: Popping Off	13.18	2.51	12.51	2.32	0.26	0.11
20: Wolf	3.61	2.12	4.64	2.08	**-0.48**	0.11
21: My Fabulous Toothbrush	2.51	1.34	2.09	1.37	**0.30**	0.11
22: Broken Toy	9.63	3.75	9.83	4.35	-0.05	0.11
26: Kiri the Kiwi	22.38	8.02	21.44	8.43	0.11	0.11
30: Principal's Message	6.00	2.47	5.96	2.69	0.02	0.11
32: Best Friend	3.65	2.16	3.14	2.00	0.23	0.11
33: Animal Antics	9.63	2.09	9.22	2.15	0.19	0.11
34: Aloha Hawaii!	6.46	1.82	6.59	1.82	-0.07	0.10
Average					0.06	

Notes: SE(ES) = Standard Error of Effect Size Bold figures = 'substantial' differences

3.5 Writing trend tasks

This following section presents the findings for the trend tasks for which there was an effect size greater than 0.30. The nature and requirements of the tasks are summarised and followed by an analysis of students' performance on each aspect of the task that was assessed (the marking criteria). The distribution of performance on the overall task score is then graphed.

The graphs show the distribution of total task scores as a cumulative percentage for year 4 and/or year 8 students in 2010 and 2006. They allow us to see a general pattern of differences. The total task score is represented on the horizontal axis; the cumulative percent of students is represented on the vertical axis.

For the task on the following page (*Get Well Card*), there was an effect size of 0.37 for year 8 students. This indicates that year 8 students in 2010 performed substantially better on this task than in 2006. From the graph we can see that about 50 percent of year 8 students scored four or below on this task (out of a possible seven) in 2010, but in 2006 about 62 percent scored four or less.

Get Well Card

Focus:	*Expressing feelings through a short message*	***Approach:***	*Station*
Year:	*8*	***Resources:***	*Get Well card, stapler*

Questions/instructions:

Imagine a friend from your class is sick in hospital.

Write a message of three or more sentences to help cheer them up.

Write your message on the card.

Results and Comment

Table 6 'Get Well Card' – NEMP results 2006 and 2010

Criteria		% responses Y8 2010 ('06)
No. of sentences written:	3 or more	87 (87)
	other	13 (13)
Quality of letter in terms of intended purpose, to cheer up sick friend: *(e.g. humour, personal support, telling about nice things that are happening, generally positive tone.)*	very good/excellent	17 (10)
	good	52 (38)
	fair	30 (40)
	poor	1 (12)
Quality of communication: *(form, punctuation, content)*	very good/excellent	15 (10)
	good	46 (42)
	fair	31 (34)
	poor	8 (14)

Year 8 students have shown an improvement since 2006 in their quality of writing a message, i.e. constructing a text for a given purpose and audience. This is shown in the increase in the number of students achieving 'good' to 'excellent' scores. Only a slight increase is shown in the quality of their communication in terms of surface features, such as punctuation.

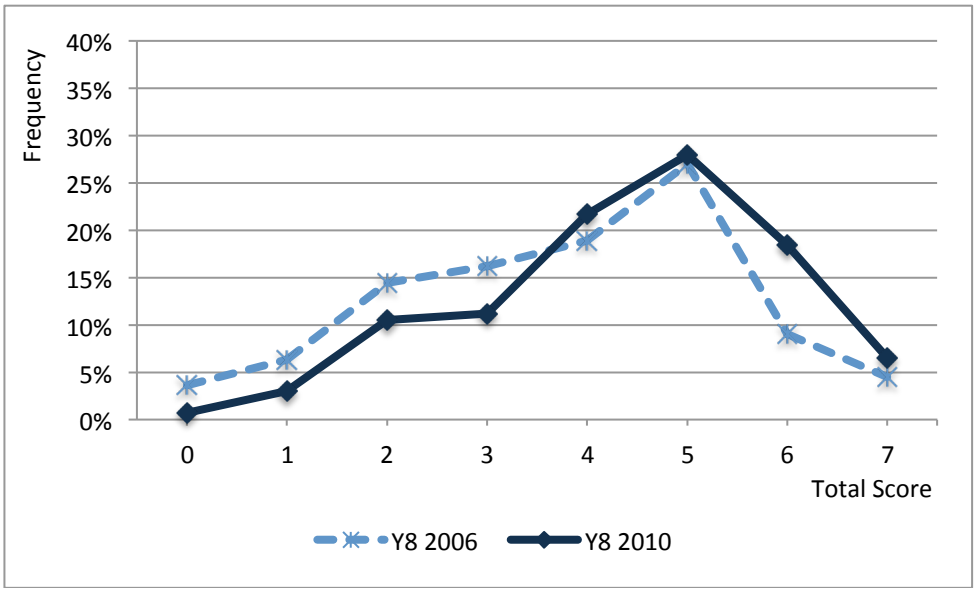


Figure 3 'Get Well Card' – Distribution of total scores

Year 8 students have shown an improvement on this task since 2006. For example, the graph shows that in 2010, 25 percent of students got a total score of three or less (out of a possible seven marks) compared to about 40 percent of students in 2006.

Wolf

Focus:	*Describing*	***Approach:***	*Station*
Year:	*4 & 8*	***Resources:***	*Video recording on laptop computer*

Questions/instructions:

This activity uses the computer.

Click on the button that says *Wolf*.

Voice-over instructions: *[instructions repeated in student's answer booklet.]*
Watch the video and think about all the words that you could use to describe the wolf. You can write the words on your page while you watch.

Video plays. *[Short, animation; sound of wind and very dramatic music with wolf roaring into the screen at the end.]*

Now write a description of the wolf. Try to use as many descriptive words as you can so that a reader can get a really good idea about what the wolf is like.

Video plays again.

Results and Comment

Table 7 'Wolf' – NEMP results 2006 and 2010

Criteria		% responses Y4 2010 ('06)		% responses Y8 2010 ('06)	
Description of wolf's body: *(shape, eyes, teeth, ears, fur, etc.)*					
	very good/excellent	4	(10)	14	(21)
	good	18	(26)	33	(35)
	moderately good/fair	41	(43)	35	(36)
	poor	37	(21)	18	(8)
Description of sinister, scary, dangerous wolf:	very good/excellent	0	(2)	6	(11)
	good	6	(9)	23	(40)
	moderately good/fair	42	(57)	45	(39)
	poor	52	(32)	26	(10)
Richness of descriptive words/phrases used:	very good/excellent	1	(1)	6	(9)
	good	9	(13)	25	(36)
	moderately good/fair	34	(48)	42	(44)
	poor	56	(38)	27	(11)

In 2010, year 8 students performed better than year 4 students with 32 percent versus 8 percent of students scoring above 50 percent, providing a rich descriptive account of the wolf that could be described as 'good' to 'excellent'. Compared with four years ago, year 4 and year 8 students have shown a decline in their ability to write descriptively. This is particularly noted in the decrease of 'very good/excellent' scores and increase of 'poor' scores for describing in detail the physical features of a wolf, the increase of 'poor' scores for describing the wolf's behaviour and the lack of rich descriptive words and phrases used.

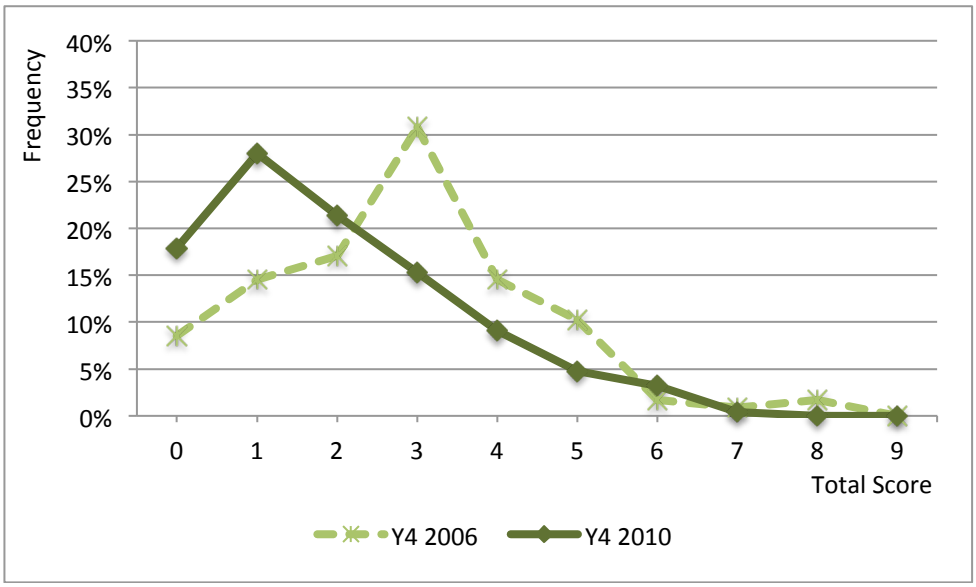


Figure 4 'Wolf' Y4 - Distribution of total scores

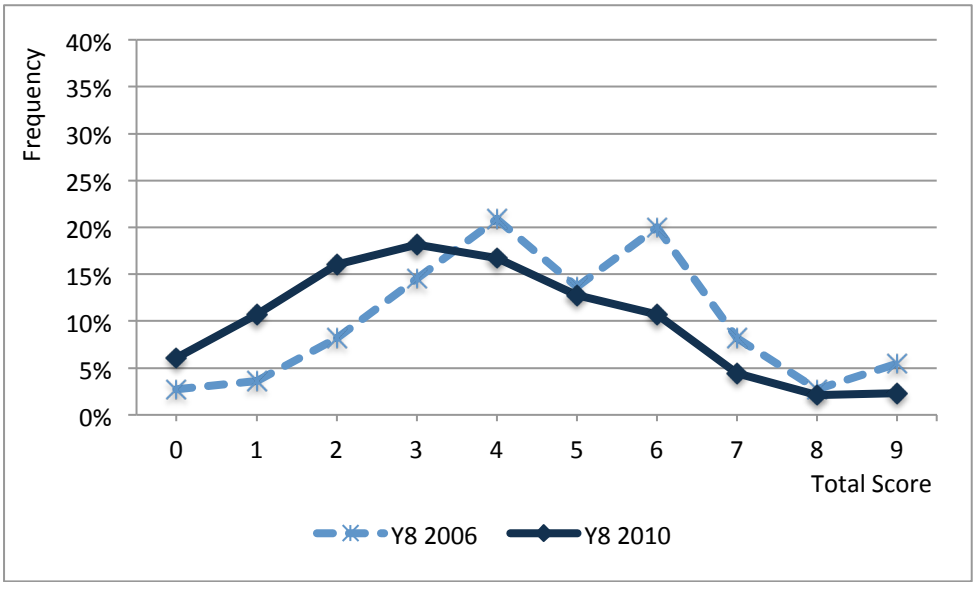


Figure 5 'Wolf' Y8 - Distribution of total scores

The graphs show this decline in the total task score from 2006 to 2010 for both year levels. For example, in 2006, 50 percent of year 8 students got a total score of four or less (out of a possible nine marks) but this increased to about 70 percent in 2010. At year 4 in 2006, 70 percent of students got a total score of three and this increased to about 85 percent in 2010.

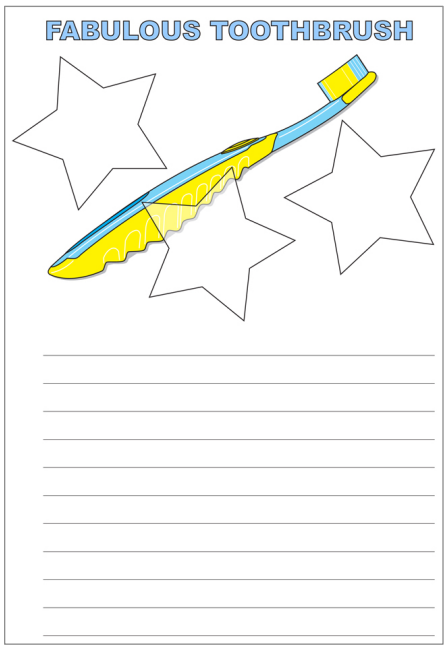
My Fabulous Toothbrush

Focus:	*Persuasive language*	***Approach:***	*Station*
Year:	*8*	***Resources:***	*Toothbrush*

Questions/instructions:

The *Fabulous Tooth Factory* has asked children to help sell their new range of "Fabulous Toothbrushes" by writing a newspaper advertisement.

1. Take the *Fabulous* Toothbrush out of the box and look at how it is designed.
2. Think about three interesting words that you think will help to sell the toothbrush. Write each word into the three star shapes on the toothbrush outline.
3. Write four or five sentences below the picture to try to persuade families to buy the toothbrush.
4. When you have finished, put the toothbrush back into the box.



Results and Comment

Table 8 'My Fabulous Toothbrush' – NEMP results 2006 and 2010

Criteria		% responses Y8 2010 ('06)
Overall persuasiveness as an advertisement:	very good/excellent	14 (12)
	good	35 (25)
	moderately good	38 (46)
	poor	13 (17)
Range of information and ideas:	high	21 (13)
	moderate	58 (53)
	low	21 (34)

In 2010 51 percent of year 8 students wrote an advertisement that was persuasive and contained a moderately high range of information and ideas. Year 8 students showed an improvement since 2006 in their ability to write persuasively (as in an advertisement) whilst providing the reader with good information about the product being sold. This is particularly shown in the increase of 'good' scores and decrease in 'poor' to 'moderate' scores for the overall persuasiveness of the students' writing. It is also shown in the increase of 'moderate' to 'high' scores for the range of information and ideas given about the toothbrush.

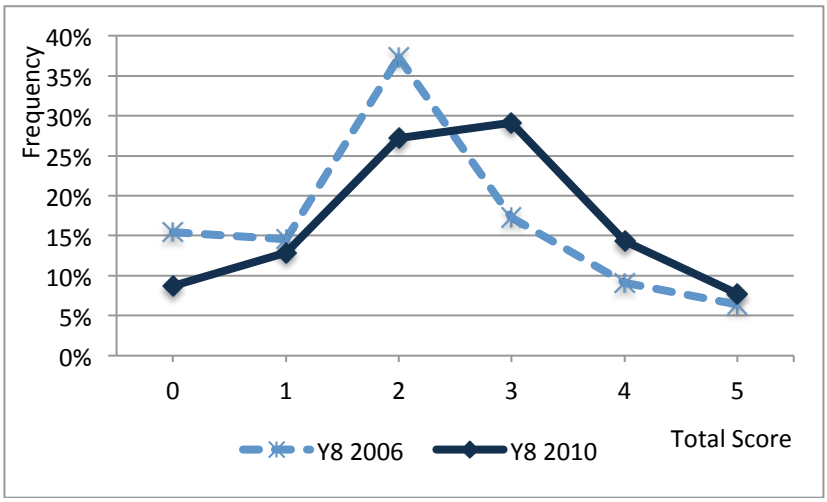


Figure 6 'My Fabulous Toothbrush' - Distribution of total scores

Year 8 students have shown an improvement on this task since 2006.

Principal's Message

Focus:	*Conventions of letter writing; explaining; expressing opinions*	***Approach:***	*Independent*
Year:	*4*	***Resources:***	*Principal's letter in answer booklet*

Questions/instructions:

Imagine that your principal is thinking of changing the school hours next year.

1. Read the principal's message below.
2. Write to the principal saying what you think about those ideas. Make sure you explain your reasons clearly.

Good Morning Children

I have been thinking about making changes to our school hours for next year and I want to know what you think.

- *School will start at 8.00am and finish at 2.00pm*
- *There will be NO morning breaks*
- *Lunch will be for half an hour*

Write me a letter and tell me what you think.

Mrs Walker
(Principal)

Results and Comment

Table 9 'Principal's Message' – NEMP results 2006 and 2010

Criteria		% responses Y4 2010 ('06)
Student's reply commented on:	8am start time	45 (51)
	2pm end time	35 (42)
	no morning breaks	53 (67)
	length of lunchtime (half an hour)	44 (48)
	change to total time in school	13 (17)
Clarity of expression/easy to understand: *(sentence by sentence)*	very good/excellent	5 (6)
	good	26 (35)
	moderately good	35 (40)
	poor	34 (19)
Overall strength of response: *(strength of ideas/language, explanations/elaboration)*	very good/excellent	3 (3)
	good	11 (17)
	moderately good	37 (45)
	poor	49 (35)

Comment:
There was an overall decline in the performance of year 4 students between 2006 and 2010. This decline is particularly noticeable in relation to students not mentioning or commenting on all proposed changes to the school day in their letters. It is also seen in a decrease of 'moderately good' to 'good' scores and an increase of 'poor' scores in the students' ability to clearly express and support their opinions.

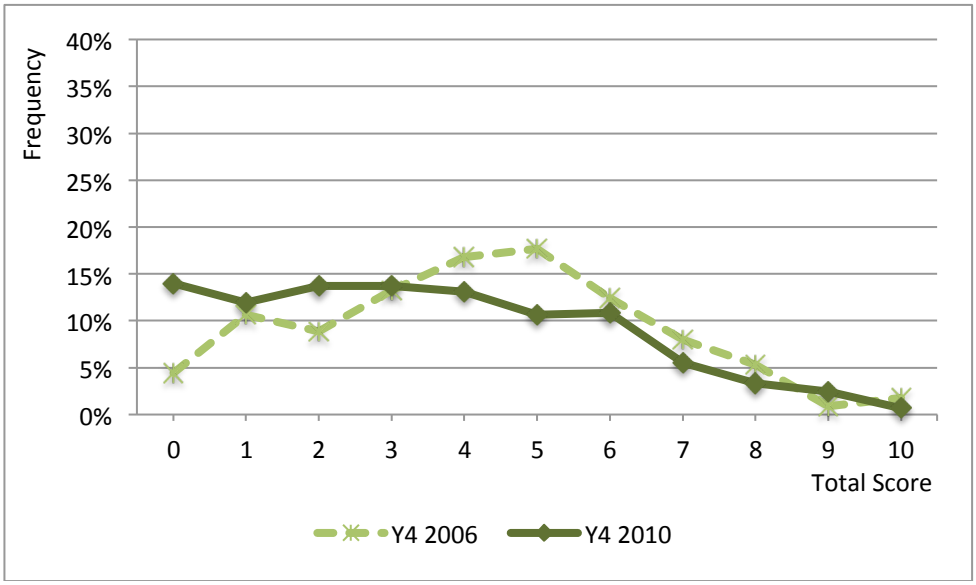


Figure 7 'Principal's Message' - Distribution of total scores

The graph shows there are more lower scoring students on this task in 2010 than in 2006. For example,in 2006, 25 percent of year 4 students got a total score of two or less (out of a possible 10 marks) but this increased to about 40 percent in 2010.

3.6 Task example: Dream Place

In this section the focus is on providing a detailed view of students' achievement on *Dream Place* - a complex writing task consisting of several phases. In Part 1, students planned a piece of writing; in Part 2, they wrote a description of their dream place; and in Part 3 they participated in an interview to discuss their piece of writing.

The task instructions are provided, and the percent of year 4 and year 8 students responding to each marking criterion is reported. This allows us to gain an in-depth understanding of students' performance over a range of different aspects of the task.

Dream Place 1 & 2

Focus:	*Surface features and deeper features of written language*	***Approach:***	*Independent*
Year:	*4 & 8*	***Resources:***	*Laptop computer, answer booklet; timer*

Questions/instructions:

Dream Place 1:

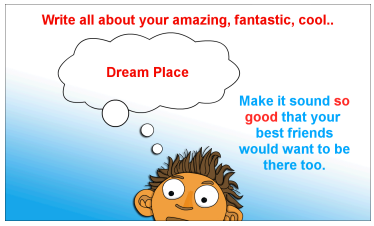
This activity uses the computer.

You are going to work on an interesting piece of writing about your dream place. You will be doing it over three days. Today, after watching a short video, you will have a few minutes to put down some of your ideas on what you might write about. On the second day you will have time to write, and on the third day you will think about what you have written and talk about any changes you might want to make. I will give you a booklet for writing in. Each day I will collect in your work, then give it back the next time you come.

Click the *Dream Place* button.

Voice-over instructions: *[instructions repeated on screen in simple animation.]*

Dream Place. There is the real place you live in. But there can also be a dream place.
A place where you would love to be.
Think about your dream place. Where is it? Who will be with you? What will it be like?
What sorts of things can you do at your dream place.
Why will it be such a great place. Write all about your amazing, fantastic, cool…
Dream Place. Make it sound so good that your best friends would want to be there too.
Your dream place can sound real or "made up".



Hand out answer booklets.

Use the first page of your booklet to plan what you will write about. Think about your dream place. Think of words and ideas to describe where this dream place is, who is with you, what it is like, what you can do there and why it is a great place. Use the next five minutes to think about and plan your writing. Use the box on the page to write your ideas.

Allow five minutes for planning.

Dream Place 2:

Use your plan and ideas to help you write about your dream place. When other people read your writing they will know where this dream place is, who is with you, what it is like, what you can do there and why it is a great place. Spend up to 20 minutes on this writing. The teacher will tell you when there is five minutes left.

Set timer to 20 minutes once student starts writing.

Results and Comment

Table 10 'Dream Place 1 & 2' – NEMP results 2010

Criteria		% responses Y4	% responses Y8
Planning			
Used a strategy to plan and organise information to prepare for writing:			
	detailed plan *(e.g. headings/sub-headings, mind-map)*	6	21
	basic plan *(e.g. list of words/ideas)*	73	76
	no plan/not written as a plan	21	3
Link between plan and actual writing:	very clear link	40	58
	some link	45	36
	little/no link	15	6
Content			
Included detail to support main ideas: *(e.g. where it is, who is there, what it is like, what can be done there, why it is a great place)*	all/almost all points covered	30	51
	some points covered	56	42
	very little detail/no points covered	14	7
Evidence of a framework/sequencing of ideas/coherence:	clearly evident	22	41
	somewhat evident	61	48
	no evidence	17	11
Language Features			
Language features used for effect: *(e.g. simile, metaphor, personification, repetition of words, phrases, listing of adjectives /adverbs etc.)*	a range of language features used *(2+)*	7	12
	a language feature used	22	30
	language features not used	71	58
Vividness/richness of language used:	excellent/very good *(very vivid, rich)*	1	5
	good *(somewhat vivid/rich, evidence of selection of vocab)*	11	17
	moderately good *(some descriptions)*	45	44
	very little/no/poor descriptions	43	34
Punctuation used for effect: *(e.g. exclamation mark, question mark, ellipsis, parenthesis, quotation marks, upper case letters)*	a range of punctuation used for effect *(2+)*	7	13
	punctuation used for effect *(1)*	16	21
	no punctuation used for effect	77	66
Correct spelling of high frequency words:	all/almost all correct	68	81
	sometimes correct	26	18
	mostly incorrect	4	1
	not used because not required	2	0
Correct use of capital letters:	all/almost all correct	39	54
	sometimes correct	34	29
	mostly incorrect/omitted	26	17
	not used because not required	1	0
Correct use of full stops:	all/almost all correct	49	57
	sometimes correct	26	26
	mostly incorrect/omitted	22	14
	not used because not required	3	3
Use of speech marks:	all/almost all correct	5	3
	sometimes correct	3	3
	mostly incorrect/omitted	4	4
	not used because not required	88	90

Results and Comment

		% responses	
		Y4	Y8
Use of comma for lists:	all/almost all correct	17	30
	sometimes correct	7	14
	mostly incorrect/omitted	17	12
	not used because not required	59	44
Use of commas for clauses:	all/almost all correct	6	20
	sometimes correct	4	18
	mostly incorrect/omitted	22	27
	not used because not required	68	35
Use of apostrophes for contractions:	all/almost all correct	14	19
	sometimes correct	3	7
	mostly incorrect/omitted	12	18
	not used because not required	71	56
Use of apostrophes for possession:	all/almost all correct	1	2
	sometimes correct	1	2
	mostly incorrect/omitted	8	7
	not used because not required	90	89
Correct use of singular and plural: *(subject verb agreement e.g. he is, we are, they were)*	consistently	81	85
	inconsistently	18	15
	not used/omitted	1	0
Correct use of tense:	consistently	75	76
	inconsistently	24	23
	not used/omitted	1	1
Correct use of paragraphs:	consistently and correctly	2	12
	inconsistently/incorrectly	3	8
	not used/omitted	95	80
Teacher rating of overall effectiveness of writing: *(quality of description for purpose (describing a place) and audience (unknown))*	excellent/very good	2	6
	good	12	19
	moderately good	56	50
	poor	30	25

Results and Comment

Approximately three quarters of year 4 and year 8 students wrote a basic plan as preparation for their piece of writing which was clearly linked to their subsequent writing for 40 percent of year 4 students and 58 percent of year 8 students. The majority of students at year 4 (71%) and at year 8 (58%) did not make use of language features such as similes and metaphors for effect. Just over half of students (57% and 66% respectively) used vocabulary that was moderately vivid or better. Little use was made of punctuation for effect (77% and 66%, respectively, used none). Students were mostly correct in their use of capital letters, full stops, singular and plural, and tenses. Students tended not to use speech marks, apostrophes or paragraphs in their writing. The overall rating of the effectiveness of the writing was described as good/very good or excellent for just 14 percent of year 4 students and 25 percent of year 8 students.

Cluster scores for surface features and deep features were computed for this task. Figures 8 and 9 show the distributions of scores for year 4 and year 8 students on these two features of writing respectively. Frequency distributions are used here so that we can clearly see the contrasting distributions of score points for each year level.

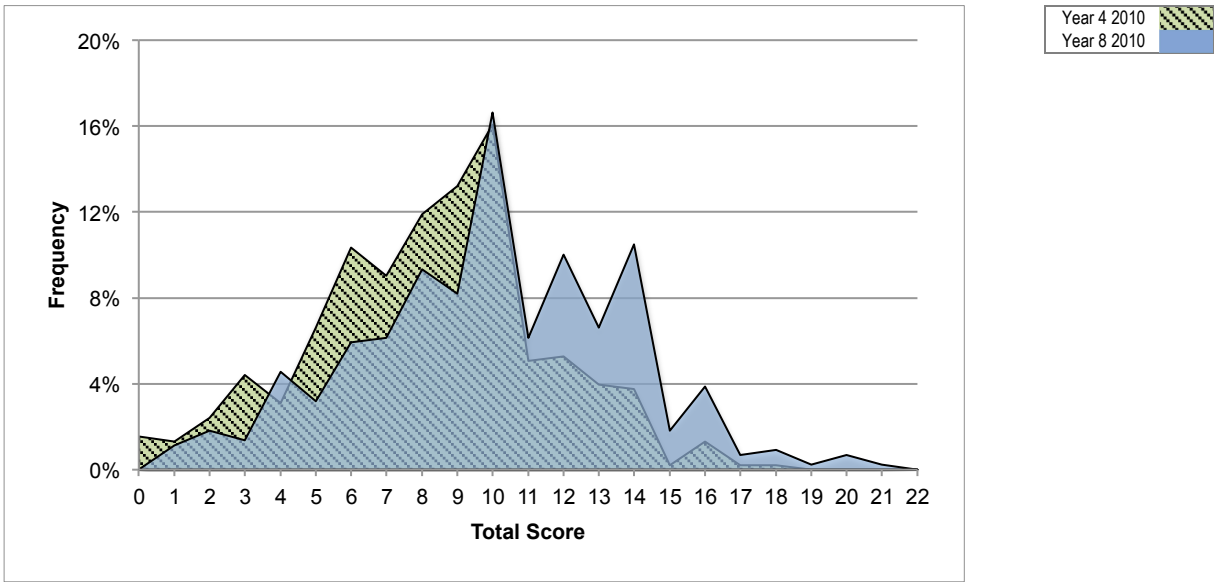


Figure 8 'Dream Place 1 & 2' - Distribution of total scores for surface features for year 4 and year 8

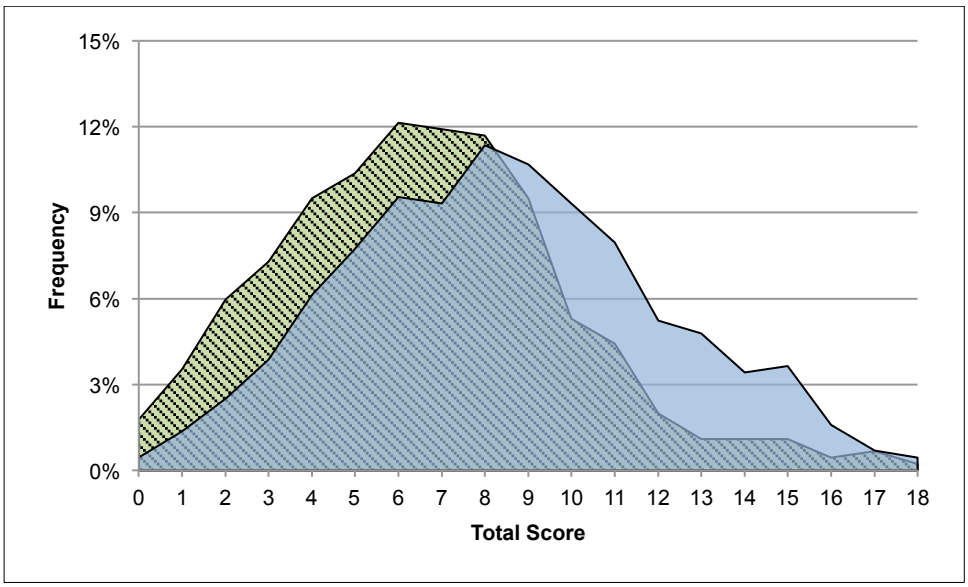


Figure 9 'Dream Place 1 & 2' - Distribution of total scores for deep features for year 4 and year 8

We can see that year 8 students generally performed better on both aspects of writing than year 4 students. The modal (most common) score for year 4 and year 8 students on surface features was 10 out of a possible 22. However, a greater proportion of year 4 students scored below this than above this. The reverse was true for year 8 students. On the deep features of writing the modal score for year 8 was eight out of a possible 18 points, whereas for year 4 it was about five. Therefore, the graphs show a clear growth in both these aspects of writing between year 4 and year 8.

Dream Place 3

Focus:	*Demonstrating understanding of aspects of the writing process*	***Approach:***	*One to one*
Year:	*4 & 8*	***Resources:***	*Answer booklet*

Questions/instructions:

Hand student their independent answer booklet. *[with student's work from 'Dream Place 1 & 2']*

This is your description of your dream place. Read it through to yourself. When you've finished, we'll talk about your writing.

Allow time.

There are quite a few things we need to be able to do, so that our writing is good writing.

1. Try to tell me all of the things about this piece of writing that you think you have done quite well.

Table 11 'Dream Place 3' – NEMP results 2010, part 1

		% responses	
		Y4	Y8
Mentioned:	specific part of their writing *(e.g. introduction/conclusion/hook)*	13	9
	good/relevant topic	7	6
	answered questions/kept on topic	12	12
	good style/good for others to read	10	13
	made sense	3	2
	used imagination	11	12
	good/clear description/explanation of place	33	51
	used interesting vocabulary/sentences	26	17
	used language features *(e.g. simile/metaphor)*	3	6
	used paragraphs	2	7
	correct/ed spelling	11	9
	correct/ed punctuation	35	24
	wrote neatly	4	1

Most of us can make improvements to our writing. Think about the things you could do to improve this piece of writing. Write a number beside each place or thing where you could make improvements, then we will talk about the improvements you could make. Write 1 beside the first place, 2 beside the second place, and so on.

Hand student red pen. Allow time.

Now let's talk about the improvements you could make to what you have written.

2. Tell me about number 1. What would you do?
3. Why would you do that?

Repeat question 2 and 3 until all numbers have been talked about.

Table 12 'Dream Place 3' – NEMP results 2010, part 2

		Y4	Y8
Suggested improvements:	response similar to a response already scored	49	56
	add more detail/make it longer	31	49
	remove/replace/insert word/phrase	62	55
	spelling	34	31
	punctuation	32	38
	grammar	9	5
	use paragraphs	5	10
	write more neatly	15	7
	any other/no response	61	47
Quality of improvements:	changes were sensible and reasonable	73	75

Comment

Students talked about a wide range of aspects of writing in terms of what they did well. The aspects most frequently cited by students were the quality of their description (33% and 51% for year 4 and year 8 respectively), and the correct/ed punctuation (35% and 24% respectively). When asked how they would improve their writing, students tended to focus on removing/replacing a word or phrase, adding more detail, or paying attention to their spelling and punctuation. Approximately 75 percent of all students made changes to their writing that was sensible and reasonable. *Note: no total score was created for this part of the task.*

3.7 Writing survey

Writing is the fourth most popular of 14 subjects for year 4 students and the eighth most popular for year 8 students.

Students were asked what writing activities they liked most at school, choosing up to three responses from a list of six. The percentage of students choosing each option is summarised in Table 13 with comparative figures from 2006, 2002 and 1998.

Table 13 Survey responses to "Which writing activities do you like doing the most at school?"

Preferred Writing At School	Year 4				Year 8			
	2010	('06	'02	'98)	**2010**	('06	'02	'98)
writing stories	73	(73	60	72)	75	(70	60	70)
writing poems	46	(50	52	49)	39	(45	42	46)
writing letters	49	(50	46	51)	32	(32	31	41)
keeping a diary	31	(33	33	42)	19	(20	25	25)
writing in science, social studies and other subjects	23	(32	33	27)	31	(39	40	29)
other	21	(12	16	14)	18	(19	16	14)

As for other years of national monitoring writing stories was clearly the most popular writing activity for both year 4 and year 8 students. Writing poems retained quite high popularity at both year levels along with writing letters at year 4. Writing in science, social studies and other subject areas has become less popular since 2006, particularly at year 4.

Students were then asked what writing activities they liked to do in their own time, choosing their favourite activity from among a list of eight options (see Table 14).

Table 14 Survey responses to "Which of these things do you like writing in your own time?"

Preferred Writing In Own Time	Year 4				Year 8			
	2010	('06	'02	'98)	**2010**	('06	'02	'98)
writing stories	38	(33	33	36)	22	(19	27	37)
writing text messages	9	(16	-	-)	37	(49	-	-)
writing letters	7	(12	16	12)	3	(4	14	14)
writing poems	15	(10	14	16)	4	(5	15	16)
writing in a diary	10	(9	14	15)	3	(4	17	12)
writing emails/tweets/blogs	8	(8	-	-)	22	(11	-	-)
writing about hobbies or sports	7	(8	10	10)	5	(5	15	8)
writing about science, social studies and other subjects	2	(2	3	5)	2	(2	3	3)

Writing stories continued to be the preferred writing activity for year 4 students. Writing electronic messages via text messages, emails, blogs, or twitter was the most popular writing activity for year 8 students.

Asked what 'people need to do to be good writers', students could choose up to three things from a list of 10 (see Table 15).

Table 15 Survey responses to "Which of these things do people need to do to be good writers?"

Things Needed By Good Writers	Year 4				Year 8			
	2010	('06	'02	'98)	**2010**	('06	'02	'98)
use their imagination	64	(57	51	56)	86	(79	66	68)
be willing to try things out	36	(36	40	36)	37	(32	29	27)
go back and check their work	34	(33	24	25)	31	(31	20	20)
learn how to use punctuation	31	(29	26	33)	33	(39	31	35)
know how to spell words	26	(25	20	23)	17	(19	15	12)
write neatly	24	(25	24	25)	5	(11	8	10)
read a lot	21	(23	19	22)	26	(16	12	13)
talk about their work with others	9	(19	15	13)	15	(6	8	8)
like writing	20	(16	19	17)	35	(41	35	38)
write lots	12	(13	14	21)	8	(13	12	15)

Compared to year 4 students, year 8 students placed greater emphasis on using their imagination and liking writing and less on writing neatly or writing lots. The trend since 1998 has been an increased emphasis of both year 4 and year 8 to use their imagination. And for year 8 students to be willing to try things out and go back, check their work, read a lot and to a lesser extent to talk about their work with others.

Students were asked what they needed to do to 'get better in writing'. For each student up to three distinct responses were coded and tallied under eight headings (Table 16). A number of interesting changes have emerged since 2006 in what students think they need to do to get better in writing. A greater proportion of year 4 students identified punctuation and understanding mechanics/grammar than they did in previous surveys since 1998. Greater proportions of year 8 students identified spelling, punctuation and editing/checking as things they need to do to get better in writing than previously.

Table 16 Survey responses to "What do you need to do to get better in writing?"

Need To Do To Get Better	Year 4				Year 8			
	2010	('06	'02	'98)	**2010**	('06	'02	'98)
spelling	22	(26	17	24)	35	(22	27	27)
neatness	28	(25	29	17)	18	(17	21	17)
punctuation	22	(16	12	11)	31	(20	20	21)
increase ideas/resources	17	(16	18	16)	27	(28	20	20)
write more often	17	(14	14	19)	11	(14	15	18)
editing/checking	13	(7	9	6)	15	(8	7	6)
understanding mechanics/grammar	12	(5	8	2)	15	(11	8	4)
enjoyment / try hard / do your best	6	(3	2	0)	6	(4	3	1)

In a more narrowly focused question, students were asked to indicate what they usually did when they couldn't spell a word they needed for writing. They could choose up to two things from a list of eight (Table 17). The most popular strategy was to use a dictionary, although for year 4 students this strategy has progressively declined since 1998. Both year 4 and year 8 students are less likely to ask a teacher than in 1998. Use of other strategies remained relatively stable over time, with the least popular strategies being to use another word or to use a computer spell checker.

Table 17 Survey responses to "What do you usually do when you can't spell a word you need for writing?"

Spelling Strategy	Year 4				Year 8			
	2010	('06	'02	'98)	**2010**	('06	'02	'98)
use a dictionary	46	(56	56	62)	55	(55	54	60)
try, then check out later	24	(29	14	16)	23	(27	15	17)
sound out the word	33	(28	33	33)	25	(21	22	18)
guess	20	(26	12	15)	23	(21	16	16)
ask the teacher	22	(17	25	34)	16	(14	18	30)
ask a friend	17	(12	16	19)	27	(30	23	27)
use another word	10	(5	6	4)	11	(7	9	9)
use computer spell checker	3	(3	2	-)	8	(7	5	-)

Students were also asked what they wrote on a computer. They could choose as many options as they liked from a list of seven (Table 18). The majority of year 8 students (80%) used the computer to write emails/messages to others such as blogs and tweets. This activity has steadily increased since 2002. The percentage of students at both year levels using the computer for other activities has remained relatively constant since 2002.

Table 18 Survey responses to "What things do you write on a computer?"

Writing Activity On Computer	Year 4			Year 8		
	2010	('06	'02)	**2010**	('06	'02)
stories	58	(59	59)	46	(45	46)
emails/twitters/blogs	40	(44	48)	80	(72	69)
letters	34	(36	41)	26	(31	43)
poems	30	(30	32)	19	(16	25)
a diary	17	(17	16)	7	(8	10)
writing about hobbies or sports	19	(16	16)	19	(17	18)
writing in science, social studies and other subjects	10	(12	11)	18	(19	21)

Responses to the 15 rating items are presented in separate tables for year 4 and year 8 students (Table 19 and Table 20). Year 4 students are generally more positive about writing at school than year 8 students. For example, students in year 8 report liking writing at school less than students in year 4 (Q1: 14% versus 37% report liking it 'heaps'; and fewer like writing in their own time 'heaps' (Q5: 14% versus 36%). In terms of opportunities to write, fewer year 8 students than year 4 students report writing 'most days' (Q7: 21% versus 43%). In addition, fewer year 8 students think they are 'really good' at writing than year 4 students (Q2: 11% versus 34%). Overall there have been no large changes between 1998 and 2010.

Table 19 Year 4 responses to 15 rating items from the writing survey

Year 4 Writing Survey – 2010 (2006 2002 1998)				
heaps	**quite a lot**	**a little**	**not at all**	
1. How much do you like writing at school?				
37 (40 36 45)	37 (32 32 27)	21 (23 25 20)	5 (5 7 8)	
				**don't know**
2. How good do *you* think you are at writing?				
34 (39 38 39)	47 (44 46 37)	11 (7 12 11)	3 (3 4 4)	5 (7 • 9)
3. How good does your *teacher* think you are at writing?				
31 (30 40 40)	41 (40 48 29)	8 (8 10 6)	1 (2 2 3)	19 (20 • 22)
4. How good does your *Mum or Dad* think you are at writing?				
66 (61 72 69)	17 (21 20 16)	5 (5 6 4)	2 (2 2 2)	10 (11 • 9)
				
5. How much do you like writing in your own time (not at school)?				
36 (43 29 34)	27 (24 27 26)	22 (18 25 23)	15 (15 19 17)	
6. How good do you think you are at spelling?				
37 (32 31 30)	45 (46 48 48)	14 (17 16 16)	4 (5 5 6)	
most days	**2–3 times a week**	**about once a week**	**hardly ever**	
7. How often do you write things like stories, poems or letters at school?				
43 (40 41 44)	24 (29 24 23)	18 (19 20 16)	15 (12 15 17)	
heaps	**quite a lot**	**sometimes**	**never**	
8. How often do you read to others what you write?				
12 (17 17 18)	23 (22 17 20)	58 (55 58 54)	7 (6 8 8)	
	heaps	**quite a lot**	**sometimes**	**never**
Who else reads what you write?				
9. teacher	46 (44 45 52)	31 (36 29 26)	21 (18 23 20)	2 (2 3 2)
10. parent	27 (25 25 28)	28 (27 23 27)	38 (39 41 37)	7 (9 11 8)
11. brother/sister	7 (11 8 11)	13 (8 9 8)	30 (29 24 29)	49 (52 59 52)
12. friend	12 (9 10 14)	22 (21 19 21)	44 (50 47 44)	22 (20 24 21)
13. other	17 (20 19 19)	15 (17 16 16)	33 (36 36 34)	35 (27 29 31)
heaps	**quite a lot**	**sometimes**	**never**	
14. How often do you write using a computer at *school*?				
10 (13 12 •)	21 (19 16 •)	58 (56 56 •)	11 (12 16 •)	
15. How often do you write using a computer at *home*?				
22 (30 26 •)	23 (20 20 •)	36 (31 27 •)	19 (19 27 •)	

Table 20 Year 8 responses to 15 rating items from the writing survey

Year 8 Writing Survey – 2010 (2006 2002 1998)				
	heaps	**quite a lot**	**a little**	**not at all**
1. How much do you like writing at school?	14 (12 13 15)	38 (35 40 45)	43 (46 40 36)	5 (7 7 4)
	☺	😐	☹	**don't know**
2. How good do *you* think you are at writing?	11 (10 14 13)	51 (54 56 51)	27 (23 25 21)	4 (5 5 4)	7 (8 • 11)
3. How good does your *teacher* think you are at writing?	13 (11 19 14)	43 (39 58 33)	14 (16 20 14)	2 (4 3 5)	28 (30 • 34)
4. How good does your *Mum or Dad* think you are at writing?	26 (26 36 29)	41 (36 46 30)	12 (13 16 11)	2 (2 2 5)	19 (23 • 25)
	☺	😐	☹	
5. How much do you like writing in your own time not at school?	14 (11 16 14)	26 (20 22 26)	32 (37 36 35)	28 (32 26 25)
6. How good do you think you are at spelling?	23 (23 25 18)	40 (44 43 43)	25 (26 22 29)	12 (7 10 10)
	most days	**2–3 times a week**	**about once a week**	**hardly ever**
7. How often do you write things like stories, poems or letters at school?	21 (21 21 19)	29 (29 26 31)	30 (32 35 30)	20 (18 18 20)
	heaps	**quite a lot**	**sometimes**	**never**
8. How often do you read to others what you write?	6 (5 7 8)	15 (16 16 19)	64 (64 67 62)	15 (15 10 11)
	heaps	**quite a lot**	**sometimes**	**never**
Who else reads what you write?				
9. teacher	26 (25 34 33)	41 (43 39 45)	31 (30 24 20)	2 (2 3 2)
10. parent	11 (10 13 13)	23 (23 30 25)	51 (55 47 53)	15 (12 10 9)
11. brother/sister	4 (3 5 5)	7 (4 7 6)	28 (30 32 34)	61 (63 56 55)
12. friend	9 (6 13 13)	22 (26 23 27)	54 (53 52 47)	15 (15 12 13)
13. other	6 (6 9 14)	11 (11 13 15)	34 (35 43 37)	48 (48 35 35)
	heaps	**quite a lot**	**sometimes**	**never**
14. How often do you write using a computer at school?	14 (11 11 •)	28 (28 24 •)	50 (56 56 •)	8 (5 9 •)
15. How often do you write using a computer at home?	34 (28 33 •)	26 (32 28 •)	29 (27 24 •)	11 (13 15 •)

The survey questions were grouped into four sets (using factor analysis). The four sets of questions (factors) were: students' perception of their writing competence; their attitudes towards writing; opportunities for sharing their written work; and opportunities for using computers for writing.

The distribution of year 4 and year 8 students on each factor is displayed in Figure 10, adjacent. In 2010 year 8 students tended to be slightly less positive than year 4 students about how good they thought they were at writing; how much they liked writing; and how often they shared their writing with others. The greatest difference between 50th percentiles was for attitudes towards writing, and a noticeably skewed distribution of attitudes for year 8 students. This indicates a large proportion of year 8 students had relatively negative attitudes towards writing. Both year 4 and year 8 students reported similar opportunities for using computers for writing.

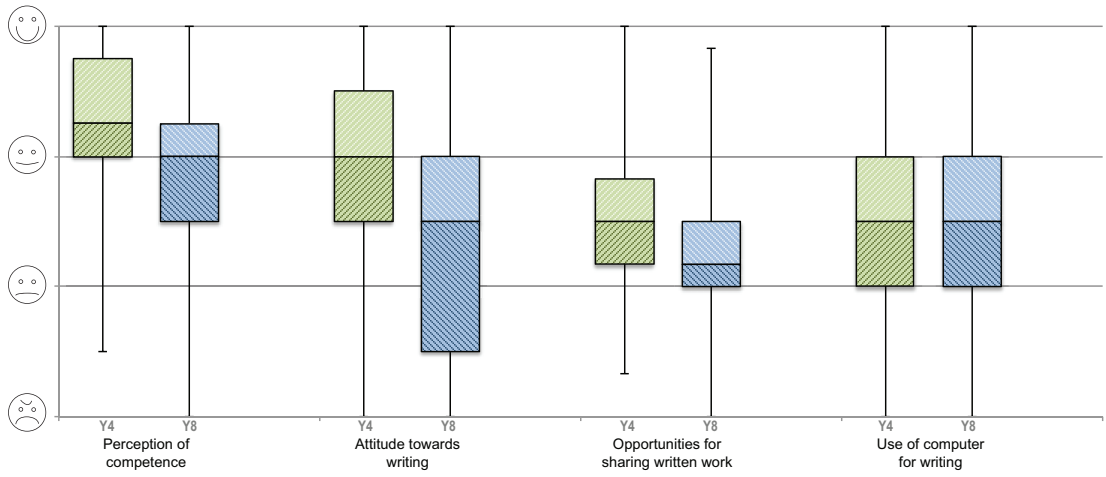


Figure 10 Distribution of student responses to four aspects of writing attitudes and opportunities

Relationship between achievement and attitudes/opportunities

To examine the relationship between students' achievement in writing and their attitudes and opportunities to write, a series of correlations analyses were undertaken for Group A tasks, using the total score (Table 21).

Table 21 Writing: Relationship between achievement, attitudes and opportunities

		Year 4	Year 8
How much do you like writing at school?		.12	**.22**
How good do *you* think you are at writing?		.04	**.19**
How good does your *teacher* think you are at writing?		.08	**.23**
How good does your *Mum or Dad* think you are at writing?		.10	**.23**
How much do you like writing in your own time (not at school)?		.02	.11
How good do you think you are at spelling?		**.31**	**.27**
How often do you write things like stories, poems or letters at school?		**.14**	.03
How often do you read to others what you write?		-.01	-.03
Who else reads what you write?	Teacher	.01	.12
	Parent	-.08	-.01
	Brother/sister	-.12	-.05
	Friend	.00	.03
How often do you write using a computer at school?		-.09	.01
How often do you write using a computer at home?		.03	.08

Note. Bolded figures represent statistical significance at p<.001. This level of significance was used because the relatively large sample sizes, and p<.001 is more likely to reflect significant relationships that are educationally meaningful.

The number of students in each correlation varied between 228 and 382, due to student absences during the assessment period and for whom a total score could not be calculated.

There is a statistically significant relationship between achievement and a number of attitudinal/opportunity questions, at year 8: specifically, how much students like writing and students' perception of how good they are and how good their teacher and their parents think they are in writing, and how good they think they are at spelling.

The only statistically significant relationships at year 4, however, were with how good they thought they were at spelling and how often they write at school. This suggests that the attitudinal factors and opportunities to write become increasingly important as students move from year 4 through to year 8.

3.8 Subgroup analysis for writing

Eight demographic variables are available for creating population subgroups. Five of the variables are related to the school students attended: school types, school size, geographic zone, community size and decile. Three variables related to the students themselves: gender, ethnicity and language used predominantly at home – English or other (see Appendix A3 for definitions of these variables).

Differences between demographic subgroups were examined by calculating the effect sizes on the total score for the focus group. The total score for each student was calculated as the sum of their cluster scores. The direction of the comparison between subgroups and the effect size are summarised in Table 22. A positive effect size would indicate that the first group performs better than the second group. The effect size of -.48 for the male/female comparison, therefore, indicates that females performed more strongly than males. Effect sizes greater than 0.30 indicate a substantial difference between the groups. The mean, standard deviation and N for each group are presented in Appendix D1.

Table 22 Writing: Effect sizes of differences between means for demographic subgroups

Demographic group	Comparison	Year 4		Year 8	
		Effect Size	ES (SE)	Effect Size	ES (SE)
Gender	Male/Female	**-0.48**	0.10	**-0.40**	0.14
Ethnicity	Pākehā & other/ Māori	**0.39**	0.13	**0.72**	0.16
	Pākehā & other/Pasifika	**0.85**	0.17	**1.05**	0.21
	Māori/Pasifika	**0.49**	0.20	0.29	0.24
School Decile	High/Low	**0.92**	0.14	**0.99**	0.18
	High/Medium	0.26	0.11	**0.51**	0.12
	Medium/Low	**0.60**	0.14	**0.46**	0.17
Geographic Zone	North Island/Auckland	-0.12	0.11	0.10	0.13
	North Island/South Island	0.27	0.14	0.02	0.14
	Auckland/South Island	**0.39**	0.14	-0.08	0.15
Community Size	Small/Medium	-0.04	0.17	0.26	0.18
	Small/Large	-0.22	0.14	0.03	0.15
	Medium/Large	-0.17	0.14	-0.20	0.15
School Size	Small/Medium	-0.07	0.19	-0.14	0.18
	Small/Large	**-0.49**	0.20	0.00	0.17
	Medium/Large	**-0.41**	0.11	0.14	0.12
School Type	Contributing/Full Primary	0.22	0.10		
	Full Primary/Intermediate			0.02	0.14
	Full Primary/Secondary			-0.24	0.18
	Intermediate/Secondary			-0.26	0.16
Language at Home	English/Other	0.08	0.14	**0.47**	0.18

Effect sizes (ES) greater than .30 were found for gender, ethnicity and school decile at both year 4 and year 8. At year 4, geographic region and size of school were also important factors. In summary the differences were:

At year 4 and year 8:

- Girls performed better than boys (.48/.40)
- 'Pākehā and other' students scored higher than Māori students (ES = .39/.72) and Pasifika students (ES = .85/1.05)
- Students in high-decile schools performed better than those in medium-decile schools (ES = .51 at year 8) and low-decile schools (ES = .92/.99). Students in medium-decile schools performed better than those in low-decile schools (ES = .60/.46).

In addition, at year 4:

- Māori students and 'Pākehā and other' students scored higher than Pasifika students (ES = .49 and .85 respectively)
- Students in the Auckland region scored higher than students in the South Island (ES = .39)
- Students in large schools scored higher than those in small schools (ES = .49) and medium-sized schools (ES = .41).

Subgroup differences in 2006 were examined task by task using analyses of variance for demographic groups that had three subgroups (i.e. student ethnicity, school, geographic zone, community size, size and type) and effect sizes for demographic groups that had two subgroups (i.e. gender and language spoken at home). In 2010 a total score for writing was used to calculate effect sizes for all pairs of subgroups of interest. Therefore, comparisons with four years ago are tenuous only. The same subgroup differences were broadly evident in 2006 and 2010 for gender, ethnicity, school decile and geographic zone. In contrast to 2010, in 2006 there was no evidence of subgroup differences for school size at year 4, or for language spoken at home for year 8 students.

4: Reading

4.1 What is reading?

This section addresses student knowledge and skills in aspects of the reading component of English in the New Zealand Curriculum. The National Monitoring Reading Framework, developed and reviewed by the Project's advisory panel, provided a structure for the development of the tasks.

The understandings aspect of the framework (Table 23) summarises important ideas about the ways in which messages might be shaped, communicated, interpreted and used. The skills and processes aspect lists key abilities that students could be expected to demonstrate while reading. The motivation aspect acknowledges the impact of motivation and attitudes on learning.

Nineteen reading tasks and a reading survey were administered. Ten tasks were administered in one-to-one interviews and nine tasks used a station approach. Sixteen of the tasks were completed by both year 4 and year 8, and three of the written tasks were done by year 8 only.

Most tasks were unreleased (link) tasks selected from the *National Education Monitoring Project 2008 Reading Assessments Results*. One task was released in 2008 and one was released in 2004 but modified significantly for this assessment.

Table 23 NEMP reading framework 2010

NEMP READING FRAMEWORK 2010	
Central organising theme: Constructing meaning from a range of texts for a variety of purposes: Reading …for enjoyment …to follow instructions …to search for information …to assimilate knowledge …to critically analyse texts and ideas	
Understandings	***Skills and Processes***
Characteristics of texts and reading processes: • Reading is both a social and a personal activity • Reading in one language can enrich and support reading in another language • Reading is a means of exchanging and interpreting meaning • Reading is an important way of acquiring language and knowledge • Reading is used in interrelated ways with speaking, listening, viewing and writing • Reading requires knowledge of language conventions which differ according to context and culture • Conventions in languages differ according to context and culture • Readers respond to the qualities of texts, including aesthetic experiences • Reading is informed by awareness of the writer's experiences, purposes and perspectives • The medium of reading is not restricted to print on paper • Reading is a complex thinking process which requires the integration of information from many sources • People read for a variety of purposes and need to adjust their strategies accordingly • Comprehension is affected by the reader's previous experiences, knowledge and interests • Effective reading requires close monitoring for understanding and accuracy	• Selecting texts for personal satisfaction and for information • Integrating semantic, syntactic and visual in text • Using decoding strategies at word and sub-word levels • Monitoring and self-correcting • Recognising words and knowing their meanings • Comprehending literal meaning • Making connections within and across texts, and with prior experiences • Adjusting reading speed to complexity and purpose • Creating mental images from texts as they are read • Retelling • Identifying main points and central ideas • Summarising • Analysing and interpreting • Making inferences • Thinking critically about what is read, the writer's intentions and the text's trustworthiness • Appreciating the writer's use of language • Reading aloud effectively for an audience • Discussing books and authors knowledgeably
Motivation	
• Enthusiasm for reading for a variety of purposes • Voluntary engagement in reading • Commitment to being a good reader	

4.2 Conceptual analysis of reading

For the purposes of analysing and reporting assessment information, tasks were allocated to clusters based on key elements of reading identified in English in the New Zealand Curriculum, the National Standards for reading and the Literacy Learning Progressions. The four clusters of tasks identified and their component tasks are as follows:

Oral reading/decoding: *the ability to decode and give meaning to the symbolic representations of sounds that are constructed into words*. This cluster comprised three tasks administered at year 4 and year 8 using the one-to-one interview approach.

Vocabulary: *knowledge of word meanings*. Three tasks were administered at year 4 and year 8. This cluster comprised two tasks using the one-to-one interview approach and the third was a paper-and-pencil task.

Literal comprehension: *the ability to extract information from text.* Five tasks comprised this cluster and were administered to both year 4 and year 8 students. Two tasks used the one-to-one interview approach and three used a paper-and-pencil approach. One further paper-and-pencil task was administered to year 8 only.

Comprehension of deeper features: *the ability to make inferences and interpret underlying meanings in texts*. This cluster consisted of five tasks that were administered at year 4 and year 8. Four tasks used the one-to-one interview approach and one used a paper-and-pencil approach. A further three paper-and-pencil tasks were administered at year 8.

There were 17 reading tasks in total. Thirteen were administered to students in the B Group (See Table 24).

Table 24 Reading: Number of assessment tasks contributing to each cluster score by group of students

Group	Oral/Decoding	Vocabulary	Literal Comprehension	Deep Comprehension	Total
A	1	-	-	2	3
B	2	3	4	4 (including one Y8-only task)	13
C	–	–	1	–	1
Total	**3**	**3**	**5**	**6**	**17**

4.3 Findings for reading 2010

Figure 11 below displays the performance of Group B students on each reading cluster. The box and whisker plots were used to show the performance of year 4 and year 8 students on each reading cluster: oral reading, deep comprehension, literal comprehension and vocabulary. The number of score points for each cluster are noted in the brackets on the x-axis below each cluster label.

It can be seen that the median percentage scores for year 4 students were highest for oral reading and literal comprehension (56% and 57% respectively) although the spread of scores on oral reading was slightly less than for literal comprehension. Year 4 students scored least well on deep comprehension (median of 26%). The same relative performance on the four clusters of tasks was repeated for year 8 students. Several points differed, however. Year 8 students' performance on deep comprehension was more similar to that on vocabulary than for year 4 students and there was less variability between the scores across the four clusters. Year 8 student achievement was consistently higher than that for year 4.

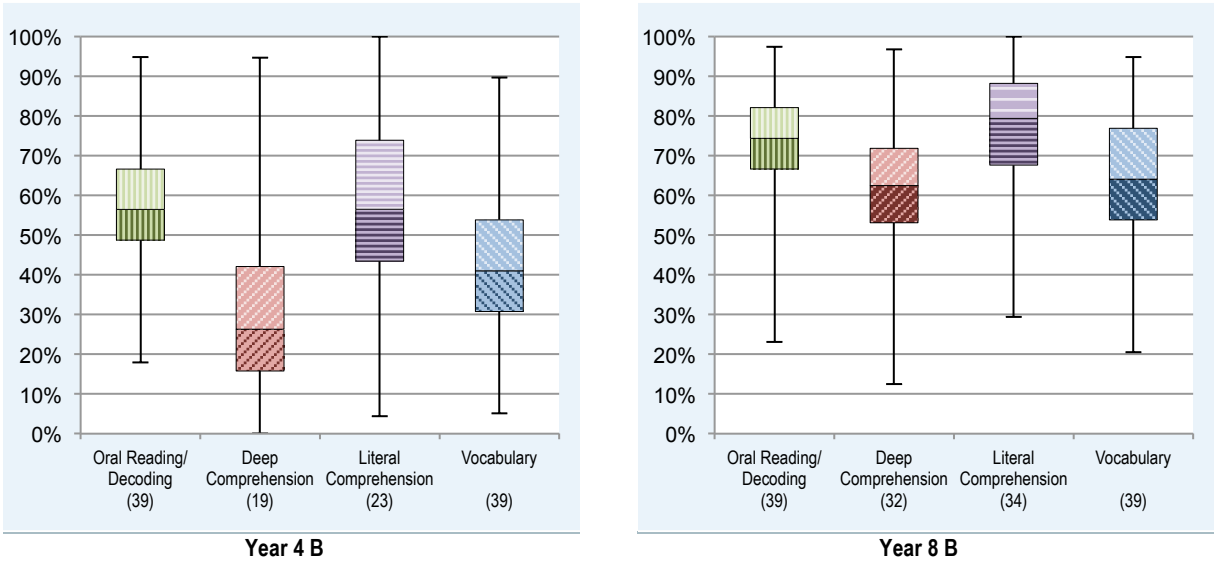


Figure 11 Percent scores on reading clusters for the year 4 and year 8 focus groups 2010

Growth from year 4 to year 8

Growth in reading achievement from year 4 to year 8 is displayed in Figure 12 on tasks in common to both year levels. The median scores for year 8 students were between 18 percent (oral reading) to 26 percent (literal comprehension) higher than those for year 4 students. Overall, the median year 8 score was 69 percent compared to 50 percent for year 4.

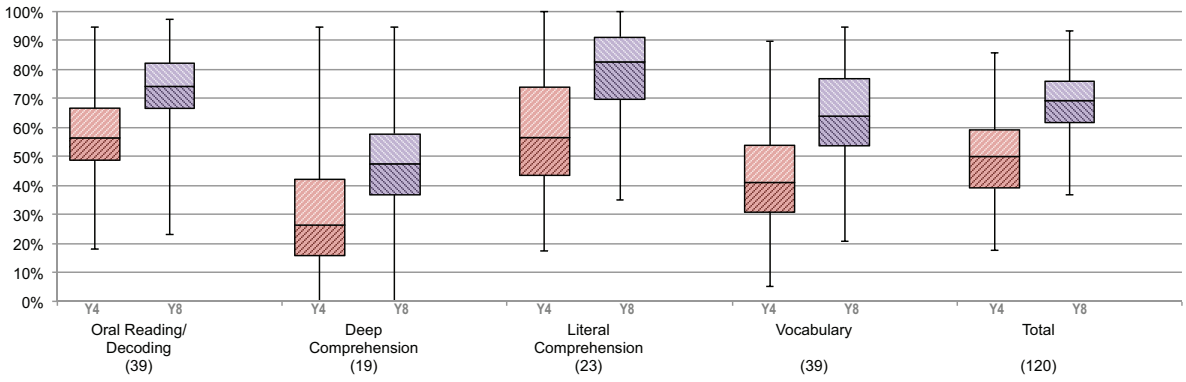


Figure 12 Growth in achievement from year 4 to year 8 in reading

4.4 Task example: Hot News

This section provides a detailed view of students' achievement on the different aspects of the task 'Hot News' and shows the distribution of overall performance of year 4 and year 8 students in the graph that follows.

Focus:	*Comprehension of literal and deep features*	***Approach:***	*One to one*
Year:	*4 & 8*	***Resources:***	*Article: 'Melting phone a wake-up call'*

Questions/instructions

Read the news article to yourself. If there are any words that are difficult I can help you. When you have finished reading, tell me by saying 'Finished'.

Hand student the article.

Start reading the article to yourself now.

When the student says 'Finished', ask the questions. Leave article with the student.

Melting phone a wake-up call

MELTED MOMENTS: The cell phone which burnt a hole in the pillow of Hamilton teen Olivia Bell as it was charging overnight.

By MICHAEL CUMMINGS – Waikato Times | Thursday, 27 March 08

A molten mess is all that's left of a cell phone that caught fire while charging in the bed of Hamilton teen Olivia Bell.

The cell phone burnt a hole in the pillow, and Olivia's mother is warning others to keep phones at a safe distance.

Angela Bell was woken by 15-year-old Olivia's screams about 10pm on Tuesday night. Mrs Bell ran into Olivia's room where the strong smell of smoke led her to inside her daughter's pillow case where the cell phone was charging.

The phone had melted as Olivia slept, burning a hole in the pillow and melting the charger plug.

Mrs Bell said the incident left her daughter shaken. 'She was just a mess, absolutely traumatised.'

Olivia was 'addicted' to her phone and was now looking to borrow another so she could keep in touch with friends. But Mrs Bell said she would be more careful in future.

'I think the lesson she learned was how dangerous these things can be and, if you're going to charge it, keep it down (away from the bed).'

Mrs Bell said it was likely other teenagers were sleeping close to their phones and they needed to be aware of the risks.

Mrs Bell was encouraging Olivia to show her friends the charred remains of the phone in an effort to avoid it happening to someone else.

First Mobile Hamilton regional manager Erin Wilson said leaving a phone to charge in a pillow case was 'the worst thing you can possibly do'.

Mrs Wilson said phones should not be left to charge for more than two hours because they could overheat.

Results

Table 25 'Hot News' – NEMP results 2010

Criteria		% responses Y4	% responses Y8
1. What is the article about?			
Number of main points included: *(girl was overcharging cell phone at night (left it on too long); put it in her pillowcase (it was covered); it overheated and/or caught fire; burnt hole in pillow and/or melted charger plug)*	4	1	3
	3	10	16
	2	27	36
	1	36	31
	0	26	14
How much detail of the rest of story was given?	extensive detail	10	6
	some detail	32	34
	very little/none	58	60
2. The headline says, 'Melting phone a wake-up call'. What does this mean?			
	melting cell phone alerted teenager / screams woke up mother	38	37
	this incident is a warning to others about the care needed when charging cell phones	6	47
3. What are the main things you learned from this article?			
	cell phones should not be charged for too long	45	51
	cell phones should not be covered while charging/left where they could overheat	23	36
4. Mrs Bell said her daughter was 'just a mess'. What did she mean when she said that?			
	her daughter was very upset, scared, traumatised, really shaken up	20	77
5. Do you think this story should be in the newspaper?	yes	94	96
6. Why do you think that?	interesting story	7	3
	people can learn from it/warning	70	91

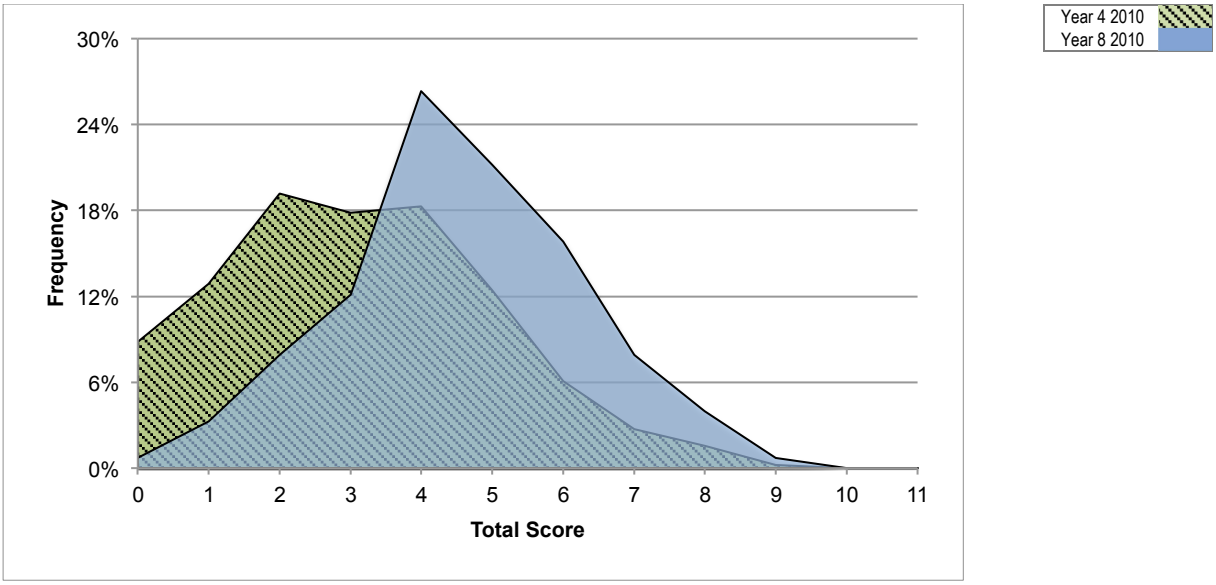


Figure 13 'Hot News' – Distribution of total scores for year 4 and year 8

Comment

When asked what the newspaper story was about, 58 percent of year 4 and 60 percent of year 8 students included very little, if any detail. Just over 40 percent at both year levels included either 'some' or 'extensive' detail. Almost half of year 8 students could understand the figurative meaning of the headline compared to six percent of year 4 students. About 40 percent of both groups made a literal interpretation of the headline. Twenty-three percent of year 4 and 36 percent of year 8 students took the correct message from the story, with another 45-51 percent taking part of the message. Three quarters of year 8 students were able to understand the term 'just a mess' compared with 20 percent of year 4 students. A high proportion of students agreed it was a suitable story for a newspaper because people could learn from it (70% vs 91%). The graph of the distribution of total task scores shows that year 8 performed more strongly overall than year 4 students.

4.5 Reading survey

Reading was third in popularity for year 4 students with 40 percent of students selecting it. It was fifth in popularity for year 8 students with 22 percent of students selecting it. While the popularity of reading for year 8 students has remained constant since 1996, there has been a progressive increase in its popularity for year 4 students. The percentage of year 4 students selecting it has increased from 23 percent in 1996, through to 40 percent in 2010 (Appendix B).

The survey sought information from students about their involvement in reading activities, in school and beyond, and about their enjoyment of these activities. For reasons of space, it was decided to not report the data for 2000 in the following tables.

Students were presented with a list of eight reading activities and asked which they like doing the most at school. They were invited to tick up to three activities (Table 26). The favourite reading activity in school at both year levels was silent reading which has remained consistently the favourite activity since 1996. The popularity of listening to the teacher reading, while still relatively high, has steadily declined since 1996, as has reading associated with written work. A relatively popular activity for both year levels was reading with a buddy or partner, and for year 8 students, looking at/browsing through books.

Table 26 Survey responses to "Which reading activities do you like doing most at school?"

Preferred Reading Activities At School	Year 4				Year 8			
	2010	('08	'04	'96)	**2010**	('08	'04	'96)
silent reading	55	(55	57	62)	67	(66	69	78)
reading with a buddy or partner	42	(47	41	47)	32	(38	35	29)
listening to the teacher reading	37	(47	51	61)	38	(33	42	58)
reading with the teacher	33	(32	35	30)	8	(13	8	7)
looking at or browsing through books	22	(23	28	20)	33	(34	33	35)
written work	16	(19	20	31)	20	(20	23	37)
reading aloud	16	(14	15	12)	11	(13	13	11)
talking about books	11	(14	12	16)	16	(13	15	16)

Another question asked the students to select up to three 'important things a person needs to be a good reader' (Table 27). They were given ten approaches to choose from. Year 4 students tended to think about reading as a technical task requiring learning hard words. In contrast, year 8 students placed greater emphasis on enjoying reading, reading a lot and thinking about what they read.

Table 27 Survey responses to "What are three very important things a person needs to do to be a good reader?"

Important Things To Be A Good Reader	Year 4				Year 8			
	2010	('08	'04	'96)	**2010**	('08	'04	'96)
learn hard words	70	(52	56	44)	20	(23	25	22)
sound out words	32	(28	30	31)	28	(34	36	36)
go back and try again	31	(31	35	45)	29	(3	31	42)
listen to the teacher	30	(36	31	29)	14	(14	14	9)
concentrate hard	30	(34	39	42)	28	(29	25	34)
read a lot	30	(34	35	32)	39	(36	39	35)
enjoy reading books	28	(28	26	28)	58	(59	58	52)
choose the right book	17	(17	13	19)	29	(28	29	28)
think about what I read	15	(16	12	13)	35	(31	25	27)
practise doing hard things	1	(15	14	12)	28	(7	8	6)

In response to a list of seven types of reading material, students were asked to indicate up to three that they liked reading in their own time (Table 28). Year 4 students preferred to read comics, story books (fiction) and magazines. These preferences were mirrored by year 8 students who also favoured reading books about real things and people (non-fiction). Year 8 students expressed a much lower preference for poetry than year 4 students.

Table 28 Survey responses to "What do you like reading in your own time?"

Preferred Reading Material In Own Time	Year 4				Year 8			
	2010	('08	'04	'96)	**2010**	('08	'04	'96)
story books (fiction)	53	(52	61	69)	70	(55	68	71)
comics	60	(52	49	48)	44	(46	37	31)
magazines	53	(46	42	26)	68	(63	72	64)
books about real things and people (non-fiction)	35	(30	37	57)	47	(40	39	46)
poetry	36	(29	33	38)	16	(15	17	19)
newspapers	22	(22	15	20)	19	(18	21	24)
junk mail	18	(16	18	18)	15	(17	17	14)

Responses to the 17 rating items are presented in separate tables for year 4 and year 8, on the following two pages (Table 29 and Table 30).

At year 4, students were positive about almost all aspects of reading, particularly about their own competence in reading (94%); liking reading at school (86%); having their teacher read a story out loud (87%); the books they read as part of their reading programme at school (85%); how good their teacher and parents think they are in reading (81% and 91% respectively); getting a book for a present (88%); how much they like going to the library (93%); looking at books in a bookshop (91%); and reading in their own time (82%). Ninety-four percent of students felt positive about how well they read.

The pattern at year 8 is somewhat similar, although more muted.

Year 8 students were positive about almost all aspects of reading, particularly about reading at school (81%); their own competence in reading (84%); how good their teacher and parents think they are in reading (66% and 76% respectively); how much they like reading in their own time (69%); getting a book for a present (71%); looking at books in a bookshop (74%); going to the library (78%); the books they read as part of their reading programme at school (64%); and having their teacher read a story out loud (79%). Eighty-four percent of students felt positive about how well they read.

Thirty-nine percent of year 4 students compared with 22 percent of year 8 students reported their teacher telling them 'heaps' or 'quite a lot' how good they are in reading; 38 percent and 37 percent of year 4 and year 8 students respectively reported their teacher telling them 'heaps' or 'quite a lot' what they need to improve their reading. Thirty-seven percent of year 4 students compared to 12 percent of year 8 students reported they read to others at school 'heaps' or 'quite a lot'. Just over a third of year 8 students (36%) reported never reading to others in class. Students most frequently report receiving feedback 'sometimes' about their reading (54%).

In 2010, only 13 percent of year 4 students and 25 percent of year 8 students 'don't know' how good their teacher thinks they are at reading. This is a positive shift since 1996 when the corresponding figures were 23 percent and 54 percent respectively.

Table 29 Year 4 responses to 17 rating items from the reading survey

Year 4 Reading Survey – 2010 (2008 2004 1996)				
				
1. How much do you like reading at school?				
47 (47 47 50)	39 (38 38 40)	10 (9 11 8)	4 (6 4 2)	
2. How good do *you* think you are at reading?				
49 (44 42 32)	45 (47 47 56)	6 (7 9 11)	0 (2 2 1)	
				**don't know**
3. How good does your *teacher* think you are at reading?				
40 (39 42 33)	41 (38 27 23)	5 (4 7 7)	1 (2 1 0)	13 (17 23 37)
4. How good does *your Mum or Dad* think you are at reading?				
74 (69 68 62)	17 (18 17 22)	4 (4 4 3)	0 (2 1 1)	5 (7 10 12)
heaps	**quite a lot**	**sometimes**	**never**	
5. Does your teacher tell you what you are good at in reading?				
13 (16 14 –)	26 (22 26 –)	54 (49 52 –)	7 (13 8 –)	
6. Does your teacher tell you what you need to improve at in reading?				
13 (14 12 –)	25 (22 16 –)	51 (51 54 –)	11 (13 18 –)	
7. How often do you read to others at school?				
16 (15 11 –)	21 (21 22 –)	48 (47 51 –)	15 (17 16 –)	
				
8. How much do you like reading in your own time – not at school?				
59 (57 60 56)	23 (24 22 29)	10 (10 11 10)	8 (9 7 5)	
9. How do you feel about getting a book for a present?				
55 (60 64 75)	33 (29 24 19)	7 (7 9 3)	5 (4 3 3)	
10. How do you feel about looking at books in a bookshop?				
61 (62 60 68)	30 (26 31 23)	7 (10 7 6)	2 (2 2 3)	
11. How do you feel about going to a library?				
72 (65 63 72)	21 (23 30 21)	5 (8 5 5)	2 (4 2 2)	
12. How do you feel about the stories/books you read as part of your reading programme at school?				
48 (44 45 47)	37 (40 38 40)	12 (10 13 9)	3 (6 4 4)	
13. How do you feel when your teacher reads a story out loud?				
63 (62 60 78)	24 (26 28 16)	7 (9 6 3)	6 (3 6 3)	
14. How do you feel about how well you read?				
62 (60 59 53)	32 (32 31 38)	5 (5 7 7)	1 (3 3 2)	
15. How do you feel about reading in a group in the classroom?				
36 (35 39 43)	31 (31 36 38)	22 (19 15 12)	11 (15 10 7)	
16. How do you feel when you are asked to read out loud to the teacher?				
42 (31 34 36)	31 (37 34 34)	17 (21 19 16)	10 (11 13 14)	
17. How do you feel when asked to read out loud to the class?				
29 (27 27 26)	28 (26 24 26)	23 (23 25 20)	20 (24 24 28)	

Table 30 Year 8 responses to 17 rating items from the reading survey

Year 8 Reading Survey – 2010 (2008 2004 1996)				
				
1. How much do you like reading at school?				
28 (28 31 31)	53 (51 50 55)	13 (16 16 12)	6 (5 3 2)	
2. How good do *you* think you are at reading?				
32 (29 29 18)	52 (56 54 56)	13 (13 15 23)	3 (2 2 3)	
				**don't know**
3. How good does your *teacher* think you are at reading?				
22 (24 21 10)	44 (39 37 27)	8 (8 7 8)	1 (4 3 1)	25 (25 32 54)
4. How good does your *Mum or Dad* think you are at reading?				
41 (38 40 27)	35 (38 33 35)	10 (6 8 9)	2 (3 1 2)	12 (15 18 27)
heaps	**quite a lot**	**sometimes**	**never**	
5. Does your teacher tell you what you are good at in reading?				
5 (5 6 –)	17 (17 16 –)	61 (60 59 –)	17 (18 19 –)	
6. Does your teacher tell you what you need to improve at in reading?				
9 (6 7 –)	28 (23 18 –)	47 (54 52 –)	16 (17 23 –)	
7. How often do you read to others at school?				
3 (2 4 –)	9 (12 10 –)	52 (49 61 –)	36 (37 25 –)	
				
8. How much do you like reading in your own time – not at school?				
37 (31 37 39)	32 (28 36 38)	19 (25 17 18)	12 (16 10 5)	
9. How do you feel about getting a book for a present?				
29 (26 35 45)	42 (39 38 39)	20 (24 20 13)	9 (11 7 3)	
10. How do you feel about looking at books in a bookshop?				
36 (33 39 52)	38 (42 37 37)	20 (18 19 9)	6 (7 5 2)	
11. How do you feel about going to a library?				
41 (39 40 53)	37 (37 41 32)	16 (19 15 12)	6 (5 4 3)	
12. How do you feel about the stories/books you read as part of your reading programme at school?				
18 (19 21 24)	46 (45 49 52)	27 (27 23 18)	9 (9 7 6)	
13. How do you feel when your teacher reads a story out loud?				
32 (35 41 51)	47 (40 41 36)	17 (19 13 10)	4 (6 5 3)	
14. How do you feel about how well you read?				
35 (36 39 30)	48 (49 45 49)	14 (12 12 18)	3 (3 4 3)	
15. How do you feel about reading in a group in the classroom?				
15 (22 31 26)	35 (34 35 41)	28 (28 25 24)	22 (16 9 9)	
16. How do you feel when you are asked to read out loud to the teacher?				
14 (21 24 19)	38 (36 35 36)	29 (27 24 25)	19 (16 17 20)	
17. How do you feel when asked to read out loud to the class?				
13 (18 18 13)	25 (25 29 25)	29 (28 23 23)	33 (29 30 39)	

Five groups of questions (factors) were identified through a factor analysis of the 2010 data: students' perception of their reading competence; their attitudes towards reading; engagement with reading activities; frequency of teacher feedback; and aspects of their reading programme. (The 'don't know' responses were omitted from the analysis.)

The distribution of year 4 and year 8 students on each factor is displayed in Figure 14. In general both year 4 and year 8 students were relatively positive about how good they were at reading, how much they liked reading, and the content/books of their classroom reading programme. In fact, there were almost no year 4 students who thought they were very poor at reading. They were slightly less engaged with their classroom reading activities. In all these respects year 4 students were slightly more positive than year 8 students. Both year 4 and year 8 students felt that they received teacher feedback 'sometimes'.

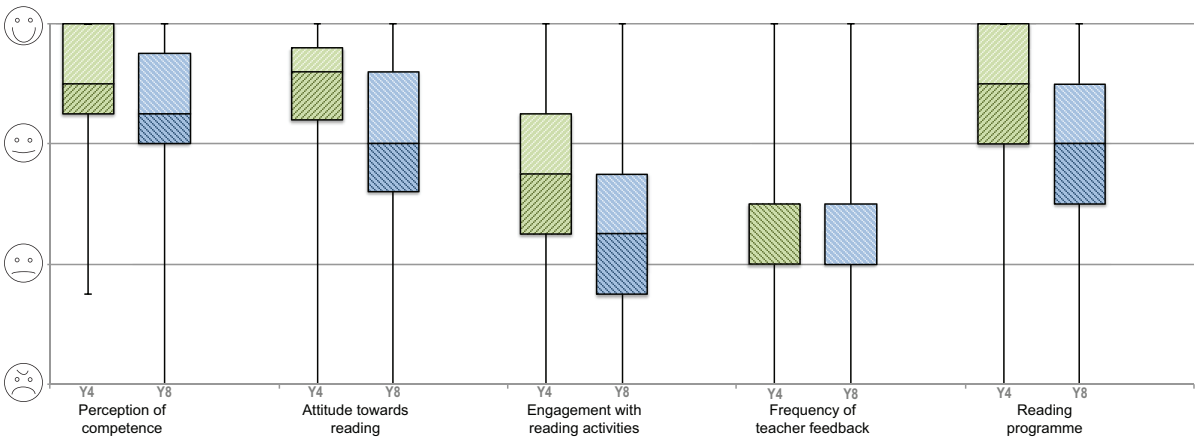


Figure 14 Box plots of components from factor analysis of reading survey

Relationship between achievement and attitudes

To examine the relationship between students' achievement in reading and their perceptions of reading, a series of correlations analyses were undertaken for Group B tasks (Table 31).

Table 31 Relationship between achievement in and perceptions of reading

	Year 4	Year 8
How much do you like reading at school?	-.05	**.32**
How good do *you* think you are at reading?	**.17**	**.37**
How good does your *teacher* think you are at reading?	.06	**.34**
How good does your *Mum or Dad* think you are at reading?	**.17**	**.29**
Does your teacher tell you what you are good at in reading?	-.12	-.02
Does your teacher tell you what you need to improve at in reading?	**-.21**	-.14
How often do you read to others at school?	**-.23**	-.00
How much do you like reading in your own time – not at school?	.01	**.37**
How do you feel about getting a book for a present?	.05	**.25**
How do you feel about looking at books in a bookshop?	.00	**.23**
How do you feel about going to a library?	-.06	.15
How do you feel about the stories/books you read as part of your reading programme at school?	**-.16**	.05
How do you feel when your teacher reads a story out loud?	-.04	-.01
How do you feel about how well you read?	.07	**.29**
How do you feel about reading out loud in a group in the classroom?	-.03	**.35**
How do you feel when you are asked to read out loud to the teacher?	-.03	**.38**
How do you feel when you are asked to read out loud to the class?	.01	**.38**

Note. Bolded figures represent statistical significance at p<.001

The number of students in each correlation varied between 192 and 281 due to student absences during the assessment period and for whom a total score could not be calculated.

There was a statistically significant relationship between overall reading achievement and a number of student perceptions about reading, particularly for year 8 students. Year 8 student achievement was significantly related to how much they like reading; how good they (and their teacher and parents) think they are at reading; how much they like reading in their own time; getting a book for a present; and looking at books in a bookshop. Their performance was also strongly related to how they feel about a number of classroom reading activities, such as, how well they read, reading aloud in a group, to the teacher or to the class.

At year 4, the relationship between achievement and student perceptions were somewhat weaker, with reading achievement being significantly related to how good they think they are at reading and how good their mum or dad thinks they are at reading. Reading achievement was inversely related to how often their teacher tells them what they need to do to improve their reading; how often they read to others at school; and how they feel about the stories/books they read as part of their reading programme. Students achieving poorly in reading tend to receive more feedback from their teacher, and like the books they are asked to read less.

4.6 Subgroup analysis for reading

Eight demographic variables are available for creating population subgroups. Five of the variables are related to the school students attended: school types, school size, zone, community size and school decile. Three variables related to the students themselves: gender, ethnicity and language used predominantly at home – English or other (see Appendix A3 for definitions of these variables).

Differences between demographic subgroups were examined by calculating the effect sizes on the total score for the focus group. The direction of the comparison between subgroups and the effect size are summarised in Table 32. A positive effect size would indicate that the first comparison group performs better than the second comparison group. The effect size of -.19 for the Male/Female comparison, therefore, indicates that females performed more strongly than males. Effect sizes greater than 0.30 indicate a substantial difference between the groups. The mean, standard deviation and N for each comparison group are presented in Appendix D2.

Table 32 Reading: Effect sizes for differences between means for demographic subgroups

Demographic group	Comparison	Year 4		Year 8	
		Effect Size*	ES (SE)	Effect Size*	ES (SE)
Gender	Male/Female	-0.19	0.12	-0.27	0.13
Ethnicity	Pākehā & other/Māori	**0.42**	0.15	**0.66**	0.17
	Pākehā & other/Pasifika	**1.20**	0.19	**1.10**	0.35
	Māori/Pasifika	**0.86**	0.23	**0.33**	0.37
School Decile	High/Low	**1.28**	0.17	**0.33**	0.24
	High/Medium	**0.50**	0.14	**0.59**	0.14
	Medium/Low	**0.64**	0.16	-0.26	0.24
Geographic Zone	North Island/Auckland	0.20	0.13	-0.28	0.15
	North Island/South Island	-0.06	0.17	-0.28	0.16
	Auckland/South Island	-0.25	0.17	0.00	0.16
Community Size	Small/Medium	-0.10	0.22	-0.11	0.21
	Small/Large	-0.06	0.15	-0.02	0.16
	Medium/Large	0.04	0.19	0.09	0.18
School Size	Small/Medium	-0.10	0.27	0.26	0.20
	Small/Large	-0.24	0.28	0.20	0.19
	Medium/Large	-0.12	0.12	-0.07	0.14
School Type	Contributing/Full Primary	0.01	0.13		
	Full Primary/Intermediate			0.20	0.16
	Full Primary/Secondary			0.22	0.19
	Intermediate/Secondary			0.02	0.18
Language at Home	English/Other	**0.85**	0.16	0.26	0.22

The demographic variables that are significantly associated with student achievement in reading were ethnicity, school decile and, for year 4, language at home.

At year 4 and year 8:

- 'Pākehā and other' students scored higher than Māori students (ES = .42/.66) and Pasifika students (ES = 1.20/1.10) and Māori students scored higher than Pasifika students (ES = .86/.33)
- Students in high-decile schools performed better than those in medium-decile schools (ES =.50/.59) and low-decile schools (ES = 1.28/.33); students in medium-decile schools performed better than those in low-decile schools (ES =.64 at year 4).

At year 4:

- Students who spoke English at home performed better than students who did not speak English at home (ES = .85/.26).

5: Mathematics

5.1 What is mathematics?

This section addresses student knowledge, strategies and skills in the three New Zealand Curriculum strands of mathematics: Number and Algebra, Geometry and Measurement, and Statistics.

The National Monitoring mathematics framework was developed and then reviewed in 2009 by the Project's curriculum advisory panel (Table 33). It identifies the areas of content linked to eight processes. The importance of attitudes and motivation is also highlighted. The framework provided a structure for the development and selection of tasks and ensured a balanced representation of important learning outcomes.

Table 33 NEMP mathematics framework 2010

NEMP MATHEMATICS FRAMEWORK 2010	
Central organising theme: **Confident mathematical and statistical thinking and application of ideas, procedures and processes**	
CONTENT	***PROCESSES***
Number and Algebra • properties/principles of number operations • patterns, relationships and generalisations • number knowledge • number strategy • symbols, equations, graphs and diagrams *Measurement* • systems of measurement and their use • selecting and using measuring devices • measurement sense • issues of measurement and accuracy *Geometry* • shape and space • position and orientation • transformation *Statistics* • collection, organisation, display and interpretation of statistical data • estimation of probabilities and use of probabilities for prediction • critical interpretation of others' data	• Making sense and finding connections • Posing questions and solving problems • Visualising and representing • Using and interacting with technologies • Reflecting and communicating • Estimating and being precise • Seeking patterns and generalising • Explaining and justifying
Attitudes and Motivation	
• Valuing • Perseverance • Interest and enjoyment • Confidence and willingness to take risks • Voluntary engagement	

Tasks were selected from the *National Education Monitoring Project 2009 Mathematics Assessment tasks*. More than half of the assessment tasks were Number and Algebra tasks, with very few Statistics tasks included (these have been included in the *Graphs, Tables and Maps* assessments).

Thirty-eight mathematics tasks were administered inclusive of a modified NumPA interview, together with a questionnaire that investigated students' interests, attitudes and involvement in mathematics.

Nine tasks were administered in one-to-one interview settings, where students used materials and visual information. Twelve tasks were attempted in a stations arrangement, where students worked independently on a series of tasks with hands-on materials, some presented on laptop computers. The final 17 tasks were administered in an independent approach, where students worked through a series of paper-and-pencil tasks.

Twelve of the tasks were identical for year 4 and year 8 students. Fifteen tasks were slightly modified and included common components between year 4 and year 8. Of the remaining tasks, 11 were specifically for year 8 students.

5.2 Conceptual analysis of mathematics

For purposes of reporting assessment information, tasks were allocated to clusters based on the strands of mathematics and statistics taken from the New Zealand Curriculum.

The majority of mathematics tasks were administered to students in the C group, with Groups A and B having only a minor focus on mathematics. The three clusters identified and their component tasks are as follows (Table 34):

Number and Algebra: Of the 27 number and algebra tasks administered, 22 tasks covered number strategies and knowledge, three tasks covered equations and expressions and two tasks covered patterns and relationships. The majority of tasks were administered at year 8 and year 4 level with some questions simplified or removed for year 4 students. Six tasks were administered to year 8 students only.

Geometry and Measurement: Of the eight geometry and measurement tasks administered, five tasks covered measurement, one task covered shape and two tasks covered transformation. Tasks were administered at year 8 and year 4 level with some questions simplified for year 4 students. Three tasks were administered to year 8 students only.

Statistics: Of the three statistics tasks administered, all covered the area of probability. Two tasks were administered to year 8 students only.

Table 34 Number of assessment tasks in each mathematics cluster by group

Group	Number and Algebra	Geometry and Measurement	Statistics	Total
A	8	4 (two Y8-only tasks)	2 (one Y8-only task)	14
B	4 (one Y8-only task)	0	0	4
C	15 (five Y8-only tasks)	5 (two Y8-only tasks, and one Yr 4 task)	1 (Y8-only task)	21
Total	**27**	**9** (one task was administered to different groups (A & C) at Y8 and Y4)	**3**	**39**

5.3 Findings for mathematics 2010

Figure 15 presents the distribution of percentage cluster scores for the focus group, Group C students. The median percentage scores for number was 55 percent, somewhat similar to the median percentage score for geometry (48%). Year 8 students scored consistently higher on both clusters (comparable figures are 74% for number and 69% for geometry). Year 8 students performed less well on the statistics cluster (median = 60%). No statistics tasks were answered by year 4 students.

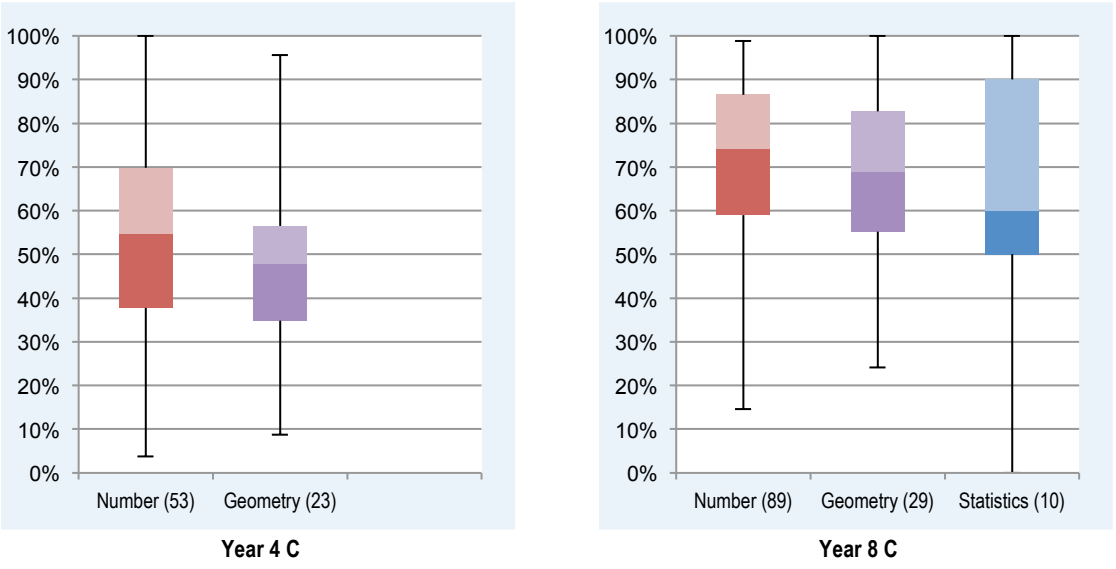


Figure 15 Distribution of percentage cluster scores for the focus group, Group C students

Growth from year 4 to year 8

Growth in mathematics achievement from year 4 to year 8 is displayed in Figure 16 for those tasks in common to both levels. The median scores for year 8 students on number and algebra, and geometry and measurement were 33 percent and 34 percent higher than those for year 4 students. Overall, the median year 8 score was 84 percent compared to 52 percent for year 4.

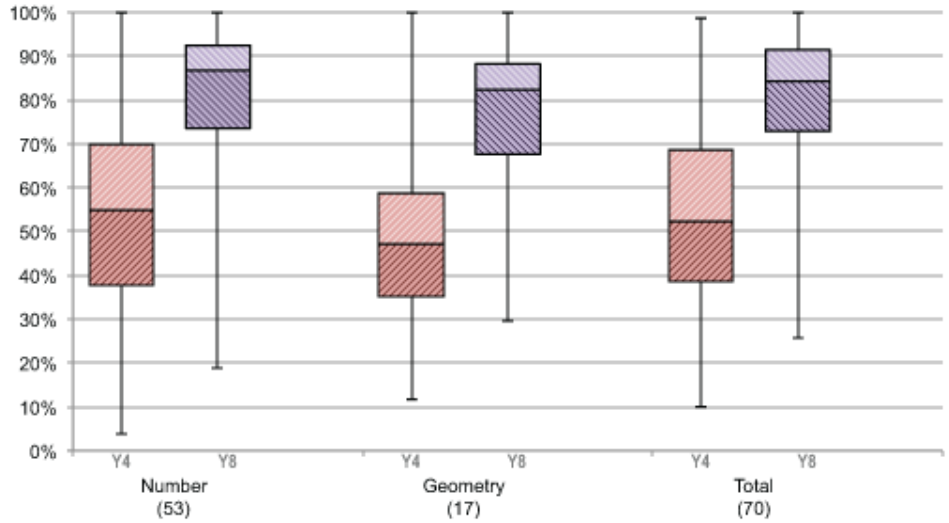


Figure 16 Box and whisker plots for growth in achievement from year 4 to year 8 in mathematics

5.4 Task example: Pizza Problems

This section provides a detailed view of students' achievement on the different aspects of the task 'Pizza Problems', and shows the distribution of overall performance in the graph that follows.

Focus:	*Number, fractions*	***Approach:***	*Independent*
Year:	*4 & 8*	***Resources:***	*Answer booklet*

Table 35 'Pizza Problems' – NEMP results 2006 and 2010

		% responses	
Year 4 & 8		Y4	Y8
1. Manu ate ½ a pizza for lunch then ½ a pizza for tea. How much pizza did he eat altogether?	1 / whole / all of it	53	92
	2/2 / 1/1	15	2
2. Sam's family ate 3 whole pizzas and ¼ of another pizza. How much pizza did they eat altogether?	3 ¼	41	82
3. George had a ¼ of a pizza and Emily had 2/4 of a pizza. How much pizza did they have altogether?	¾	41	83
4. Millee made a whole pizza and gave ½ of it to her brother. How much did she have left?	½	69	93
5. Tusiga found ¾ of a pizza in his fridge. She gave ¼ of it to her flatmate. How much pizza did she have left?	½	12	40
	2/4	40	42
6. Panu had ¾ of a pizza and Patrick had ¾ of a pizza. How much pizza did they have altogether?	1 ½	8	36
	1 2/4	8	17
	6/4	13	10
Year 8 ONLY			Y8
7. Jake had 2 pizzas. He divided each of them into quarter pieces. How many pieces of pizza did he have altogether?	8		74
8. Horowai had ½ a pizza to share with himself and 3 friends. What size of a whole pizza did each person get?	1/8		28
9. Peta had 1 and 1/3 pizzas. She divided the whole pizza into thirds. How many thirds of pizza did she have altogether?	4		47
10. Maddison wanted to share ¼ of a pizza with her friend so she divided it in 2. How much did they each get?	1/8		46

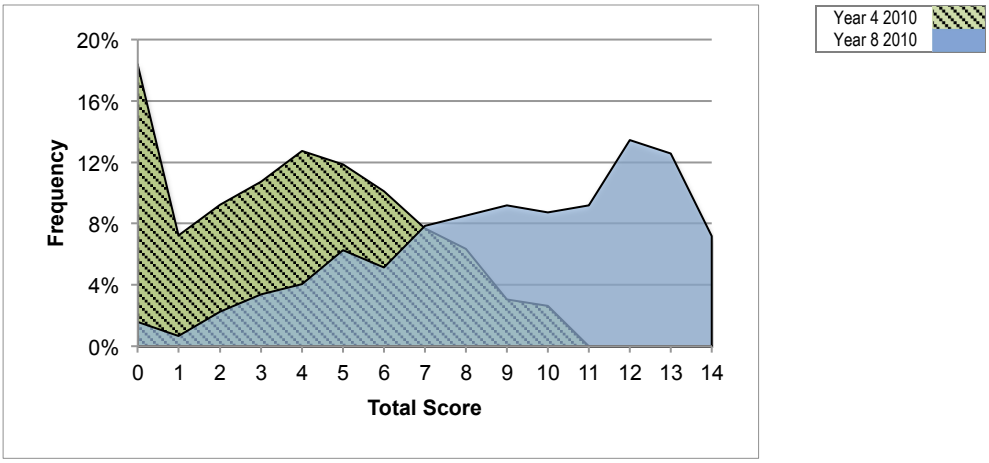


Figure 17 'Pizza Problems' – Distribution of total scores for year 4 (out of 10) and year 8 (out of 14)

Comment

As shown in Figure 17, year 8 students performed consistently better than year 4 students on the proportion problems in this task.

Note that the distributions of year 4 and year 8 total scores in the line graph are based on different numbers of items (the maximum score for year 4 was 11 and for year 8 it was 14). However, it can be seen that the distributions are quite different in shape. Greater proportions of year 8 students gained higher scores. It is interesting to note that about 18 percent of year 4 students did not get any questions correct.

5.5 Mathematics survey

Mathematics is the second most popular of 14 subjects for year 4 students with 45 percent of students selecting it among their three choices. It is the third most popular for year 8 students with 29 percent of students selecting it (Appendix B).

Students were presented with a list of nine mathematics activities and asked to nominate up to three that they liked doing at school (Table 36). The most popular maths activity for year 4 students involved doing maths worksheets (54%), whereas for year 8 students the most popular activity involved doing maths problems and puzzles (53%). Both year levels enjoyed a range of maths activities as indicated in Table 36. The least favoured activities for year 4 students included using maths textbooks (9%), while for year 8 students it was explaining their maths ideas (11%). The most notable differences between the two year-levels were that maths problems and puzzles were substantially more popular with year 8 students, while taking maths tests was substantially less popular at year 8.

Table 36 Survey responses to "What maths activities do you like doing at school?"

Maths activities students like doing at school:	Year 4				Year 8			
	2010	('09	'05	'01)	**2010**	('09	'05	'01)
[– = question not asked in that year]								
doing maths worksheets	54	(49	44	41)	38	(41	35	33)
work in my maths book	37	(46	36	40)	32	(30	27	22)
maths problems and puzzles	38	(43	41	39)	53	(57	58	60)
maths tests	36	(36	30	30)	14	(14	10	16)
using a calculator	29	(35	28	29)	36	(35	33	27)
using equipment	30	(27	37	35)	38	(42	44	43)
maths competitions	18	(21	24	22)	25	(26	23	25)
explaining my maths ideas	19	(14	9	–)	11	(8	12	–)
using maths textbooks	9	(11	16	14)	19	(20	21	17)

Students were asked to nominate three very important things a person needed to learn in order to be good at maths (Table 37). Basic facts and tables were seen by a majority of students at year 8 and by half of students at year 4 to be important (67% and 50%), followed by mathematics knowledge (37%) for year 8 students and work skills by year 4 students (36%). Since 2006, greater proportions of year 4 and year 8 students tend to identify these three activities as important strategies in mathematics.

Table 37 Survey responses to "There are some very important things a person needs to learn to do to be good at maths. What are some of them?"

Important for learning and being good at maths:	Year 4			Year 8		
	2010	('09	'05)	**2010**	('09	'05)
basic facts and tables	50	(59	43)	67	(63	53)
work skills (practice, study, revision, homework)	36	(22	21)	25	(19	18)
personal attributes (good attitudes, concentration, focus, enjoyment)	15	(17	18)	19	(20	23)
classroom behaviours (seeking help, discussing with others, paying attention)	20	(16	24)	12	(15	15)
intelligence (thinking, being brainy, being smart, being able to understand)	14	(16	17)	11	(17	15)
maths knowledge (algebra, money, percentages, use of calculators, etc.)	21	(14	14)	37	(29	23)
skills and abilities in related subjects (reading, writing)	3	(7	7)	3	(4	7)
problem-solving skills	2	(5	3)	11	(7	9)

Students were asked to name some interesting maths things they do in their own time (Table 38). Both year 4 and year 8 students placed more emphasis on basic facts and tables (45% and 31% respectively). Other frequently nominated activities included puzzles, quizzes and games (18% and 17%) then other activities; and maths skills (13% and 24%).

Table 38 Survey responses to "What are some interesting things you do in maths in your own time?"

Maths activities students do in their own time:	Year 4				Year 8			
	2010	('09	'05	'01)	2010	('09	'05	'01)
basic facts and tables	45	(47	36	56)	31	(29	20	21)
puzzles, quizzes and games	18	(24	25	23)	17	(22	23	24)
maths homework	9	(10	8	7)	9	(9	9	10)
maths skills (excluding basic facts)	13	(9	14	9)	24	(21	16	25)
life skills maths (counting money, banking, calculating animal feed, fencing for paddocks, etc.)	5	(3	3	3)	10	(10	12	15)
none	6	(6	7	8)	11	(16	18	16)
other	12	(9	16	8)	12	(3	14	12)

Responses to the 11 rating items are presented in separate tables for year 4 and year 8 (Tables 39 and 40). Year 4 students were generally very positive about mathematics with sizable proportions who would like to do more (38%); 86 percent who like it 'heaps' or 'a lot'; and 89 percent believing they are good at it, as well as reporting that their teacher (73%) and their parents (85%) think they are good at mathematics.

The views of year 8 students are generally less positive than year 4 students. Fourteen percent would like to do more maths; 73 percent like it 'heaps' or 'a lot'; and 77 percent believe they are good at it. Sixty-one percent of year 8 students believe their teacher thinks they are good at maths, and 76 percent believe their parents think they are good at maths. These patterns have been relatively stable since 2000. The proportion of year 8 students who 'don't know' how good their teacher thinks they are at maths has declined from 33 percent in 2001 to 23 percent in 2010; and the proportion who 'don't know' if their parents think they are good at maths has declined from 25 percent to 11 percent. Generally, more students tend to believe they are better at mathematics than they believe their teacher thinks they are (89% versus 63% at year 4; 77% versus 61% at year 8).

Table 39 Year 4 responses to 11 rating items from the mathematics survey

Year 4 Mathematics Survey – 2010 (2009 2005 2001)				
more	about the same	less		
1. Would you like to do more, the same or less maths at school?				
38 (40 37 38)	46 (42 41 39)	16 (18 22 23)		
2. How much do you like doing maths at school?				
50 (55 50 51)	36 (31 34 30)	8 (10 10 10)	6 (4 6 9)	
3. How good do *you* think you are at maths?				
42 (45 33 41)	47 (43 55 45)	9 (9 8 10)	2 (3 4 4)	
				don't know
4. How good does your *teacher* think you are at maths?				
37 (46 39 46)	36 (32 30 25)	4 (5 6 5)	1 (1 1 1)	22 (16 24 23)
5. How good does your *Mum or Dad* think you are at maths?				
67 (69 63 65)	18 (18 21 15)	5 (2 4 4)	1 (1 2 1)	9 (10 10 15)
6. How much do you like doing maths on your own?				
49 (49 50 53)	32 (27 26 23)	9 (13 14 14)	10 (11 10 10)	
7. How much do you like doing maths with others?				
57 (62 59 55)	28 (26 25 27)	8 (8 7 9)	7 (4 7 9)	
8. How much do you like helping others with their maths?				
56 (64 60 56)	27 (22 22 25)	11 (9 9 9)	6 (5 9 10)	
9. How do you feel about doing things in maths you haven't tried before?				
49 (45 47 47)	35 (31 31 28)	12 (16 14 15)	4 (8 8 10)	
10. How much do you like doing maths in your own time not at school?				
33 (38 40 37)	31 (26 26 23)	20 (16 14 16)	16 (20 20 24)	
11. How do you feel about learning or doing maths as you get older?				
61 (68 64 -)	26 (21 24 -)	6 (7 6 -)	7 (4 6 -)	

Table 40 Year 8 responses to 11 rating items from the mathematics survey

Year 8 Mathematics Survey – 2010 (2009 2005 2001)	more	about the same	less		don't know
1. Would you like to do more, the same or less maths at school?	14 (15 14 13)	61 (65 59 59)	25 (20 27 28)		
2. How much do you like doing maths at school?	23 (24 25 26)	50 (51 48 40)	19 (19 19 23)	8 (6 8 11)	
3. How good do *you* think you are at maths?	20 (14 23 22)	57 (64 56 58)	20 (16 16 16)	3 (6 5 4)	
4. How good does your *teacher* think you are at maths?	19 (15 20 20)	42 (47 39 34)	14 (12 8 10)	2 (2 3 3)	23 (24 30 33)
5. How good does your *Mum or Dad* think you are at maths?	34 (29 31 35)	42 (44 43 32)	12 (11 10 7)	1 (2 2 1)	11 (14 14 25)
6. How much do you like doing maths on your own?	18 (20 26 23)	36 (36 38 42)	29 (28 22 21)	17 (16 14 14)	
7. How much do you like doing maths with others?	43 (46 46 49)	40 (38 37 34)	11 (13 14 11)	6 (3 3 6)	
8. How much do you like helping others with their maths?	28 (30 33 30)	41 (44 38 40)	21 (20 21 20)	10 (6 8 10)	
9. How do you feel about doing things in maths you haven't tried before?	35 (34 32 33)	39 (45 45 38)	21 (16 17 21)	5 (5 6 8)	
10. How much do you like doing maths in your own time not at school ?	7 (9 11 9)	25 (23 22 22)	35 (31 31 33)	33 (37 36 36)	
11. How do you feel about learning or doing maths as you get older?	37 (34 32 -)	43 (47 50 -)	16 (14 14 -)	4 (5 4 -)	

Three groups of questions (factors) were identified through factor analysis on the 2010 data. These were: students' perception of their maths competence; their attitudes towards maths; and their engagement with maths activities.

The distribution of year 4 and year 8 students on each factor is displayed in Figure 18. In general both year 4 and year 8 students were relatively positive about how good they thought they were at maths (perception of competence), and how much they liked maths (attitudes towards maths). However, both groups of students were less engaged with maths activities. Year 8 students' views were less positive overall than those for year 4. A notable difference between the two year levels is the much greater proportion of year 8 students whose attitudes are strongly negative.

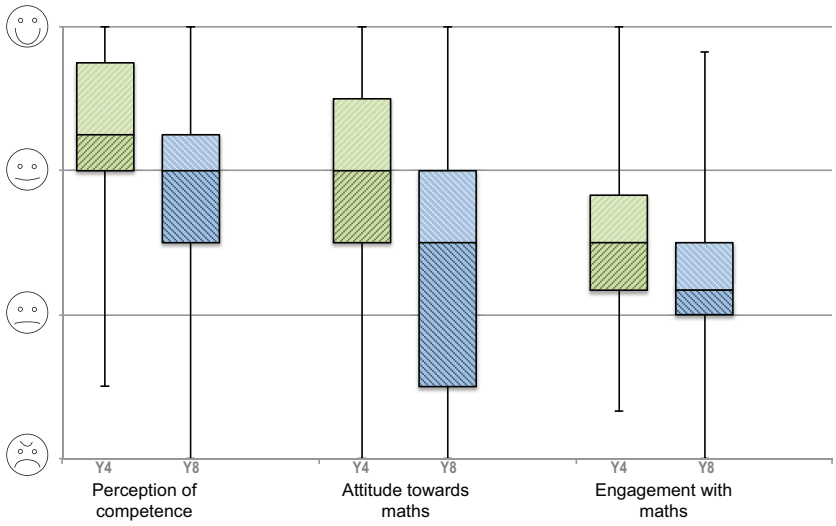


Figure 18 Distribution of year 4 and year 8 students' perceptions to mathematics

Relationship between achievement and attitudes

To examine the relationship between students' achievement in writing and their attitudes to maths, a series of correlations analyses were undertaken for Group C tasks, using the total score (Table 41).

Table 41 Relationship between achievement in and perceptions to mathematics

	Year 4	Year 8
How much do you like doing maths at school?	.04	**.37**
How good do *you* think you are at maths?	**.22**	**.54**
How good does your *teacher* think you are at maths?	.13	**.41**
How good does your *Mum or Dad* think you are at maths?	.13	**.38**
How much do you like doing maths on your own?	.02	**.20**
How much do you like doing maths with others?	.01	.10
How much do you like helping others with their maths?	-.10	.15
How do you feel about doing things in maths you haven't tried before?	.07	**.26**
How much do you like doing maths in your own time (not at school)?	-.12	.12
How do you feel about learning or doing maths as you get older?	.02	.14
Would you like to do more, the same or less time at doing maths at school?	-.00	.18

Note. Bolded figures represent statistical significance at p<.001

The number of students in each correlation varied between 231 and 407 due to student absences during the assessment period and for whom a total score could not be calculated.

There is a statistically significant relationship between overall mathematics achievement and a number of student perceptions about mathematics, particularly for year 8 students. Year 8 student achievement was significantly related to how much they like maths; how good they (and their teacher and parents) think they are at maths; how much they like doing maths on their own, and how they feel about doing things in maths that they haven't done before. At year 4, the relationships between achievement and student perceptions are substantially weaker or non-existent. The only statistically significant relationship was found with how good they think they are at maths.

5.6 Subgroup analysis for mathematics

Eight demographic variables are available for creating population subgroups. Five of the variables are related to the school students attended: school types, school size, geographic zone, community size and decile. Three variables related to the students themselves: gender, ethnicity and language used predominantly at home – English or other (see Appendix A3 for definitions of these variables).

Differences between demographic subgroups were examined by calculating the effect sizes on the total score (sum of cluster scores) for the focus group. The direction of the comparison between subgroups and the effect size are summarised in Table 42. A positive effect size would indicate that the first comparison group performs better than the second comparison group. The effect size of .19 for the male/female comparison, therefore, indicates that males performed more strongly than females. Effect sizes greater than 0.30 indicate a substantial difference between the groups. The mean, standard deviation and N for each comparison group are presented in Appendix D3.

Table 42 Mathematics: Effect sizes of the differences between means for demographic subgroups

Demographic group	Comparison	Year 4		Year 8	
		Effect Size*	ES (SE)	Effect Size*	ES (SE)
Gender	Male/Female	0.19	0.10	0.26	0.12
Ethnicity	Pākehā & other/ Māori	**0.71**	0.13	**0.80**	0.18
	Pākehā & other/Pasifika	**0.92**	0.18	**1.23**	0.24
	Māori /Pasifika	0.24	0.20	**0.44**	0.29
School Decile	High/Low	**0.97**	0.14	**1.05**	0.20
	High/Medium	**0.58**	0.11	**0.54**	0.12
	Medium/Low	**0.42**	0.13	**0.39**	0.20
Geographic Zone	North Island/Auckland	0.07	0.11	-0.05	0.13
	North Island/South Island	0.01	0.13	-0.09	0.15
	Auckland/South Island	-0.06	0.14	-0.04	0.15
Community Size	Small/Medium	-0.07	0.17	0.12	0.19
	Small/Large	-0.20	0.13	0.06	0.14
	Medium/Large	-0.14	0.14	-0.04	0.17
School Size	Small/Medium	-0.28	0.19	-0.22	0.19
	Small/Large	**-0.48**	0.20	-0.22	0.18
	Medium/Large	-0.20	0.11	0.01	0.13
School Type	Contributing/Full Primary	0.00	0.10		
	Full Primary/Intermediate			0.02	0.15
	Full Primary/Secondary			-0.11	0.18
	Intermediate/Secondary			-0.13	0.16
Language at Home	English/Other	**0.43**	0.14	**0.44**	0.17

The demographic variables that were significantly associated with student mathematics achievement in year 4 and year 8 were ethnicity, school and language at home; and for year 4 also school size.

At year 4 and year 8:

- 'Pākehā and other' students score higher than Māori students (ES = .71/.80) and Pasifika students (ES =.92/1.23) and Māori students score higher than Pasifika students (ES =.44 at year 8)
- Students in high-decile schools performed better than those in medium-decile schools (ES =.58/.54) and low-decile schools (ES =.97/1.05); students in medium- schools performed better than those in low-decile schools (ES =.42/.39)
- Students who spoke English at home performed better than students who spoke other languages (ES =.43/.44).

In addition, year 4 students in large schools performed substantially better than those in small schools (ES =.48).

6: Conclusion

The findings overall indicate that there is reasonable growth between year 4 and year 8 in achievement in writing, reading and particularly mathematics. There is no real change in the level of writing at either year level between 2006 and 2010. Year 4 students tend to be more positive than year 8 students about each area of the curriculum and this was reflected in the rankings of favourite areas of the curriculum. It was particularly noticeable in mathematics that a large proportion of year 8 students held negative views of mathematics.

The relationship between achievement and attitudes was substantially stronger for year 8 students than for year 4 students. In the main, high achievement is significantly positively related to how much students like a particular learning area, how good they think they are at it, and how good their teacher or parents think they are at it.

'Pākehā and other' students tended to perform better than Māori and Pasifika students in each area of the curriculum. Students in high-decile schools tended to perform better than students in medium and low-decile schools. Speaking English at home was a significant factor in writing and mathematics. The only significant gender difference was found for writing where girls perform better than boys.

7: Appendices

Appendix A: The sample of schools and students in 2010

Year 4 and year 8 samples

In 2010, 2862 children from 159 schools were in the main samples to participate in national monitoring. About half were in year 4, the other half in year 8. Schools were selected randomly from national lists of state, integrated and private schools teaching at that level, with their probability of selection proportional to the number of students enrolled in the level. The process used ensured that each region was fairly represented. Schools with fewer than 18 students enrolled at the given level were excluded from these main samples, as were special schools and Kura Kaupapa Māori.

The principal of each selected school was contacted and asked to consult with their staff and Board of Trustees and confirm their participation. Schools unable to participate were replaced in the sample by a school with similar characteristics (3% of original sample).

From the cohort roll provided by each school, a group of 18 students was selected and assigned to one of three groups using a computer generated random number. The lists of students were sent back to their schools for confirmation. Letters were sent to parents informing them of their child's inclusion in the project and advising them of the opportunity to exclude their child. When students were excluded either by the school or their parents, another student from the school was randomly selected (4% of original sample). Once assessment at a school was underway there were instances of student absence, but for most of the tasks, over 90 percent of the sampled students were assessed. The main samples can be regarded as very representative of the populations from which they were chosen.

Table A1 Composition of the student sample by region

PERCENTAGES OF STUDENTS FROM EACH REGION		
REGION	% year 4 sample	% year 8 sample
Northland	3.8	3.8
Auckland	36.2	35.0
Waikato	11.3	12.5
Bay of Plenty/Poverty Bay	7.5	5.0
Hawkes Bay	3.8	3.8
Taranaki	2.5	2.5
Wanganui/Manawatu	3.8	3.8
Wellington/Wairarapa	11.2	11.2
Nelson/Marlborough/West Coast	3.7	3.7
Canterbury	11.3	12.5
Otago	3.7	3.7
Southland	1.2	2.5

Composition of the sample

Because of the sampling approach used, regions were fairly represented in the sample, in approximate proportion to the number of school children in the regions (Table A1).

The composition of the samples in relation to the other demographic variable could be checked for gender, ethnicity, school decile and school type. The other variables are either unique to NEMP or are defined in an alternative way to available national statistics. National figures for these variables are in Table A2.

The composition of the NEMP samples in relation to these variables indicate that they are broadly representative.

Table A2 Composition of the student population by gender, ethnicity, school decile and type

DEMOGRAPHIC VARIABLES			
STUDENT VARIABLES (percentage of students in each category)			
Variable	Category		Percent (Both)
Gender	Male		51
	Female		49
Ethnicity	Other (Pākehā & others)		68
	Māori		22
	Pasifika		10
School Decile	Deciles 1-3		26
	Deciles 4-7		36
	Deciles 8-10		38
		Y4	Y8
Type of School	Contributing	61	-
	Full Primary	39	31
	Intermediate	-	48
	Composite (y1-15)	-	7
	Restricted Composite (y7-10)	-	14

Table A3 Composition of the student sample by demographic variables

DEMOGRAPHIC VARIABLES			
STUDENT VARIABLES (percentage of students in each category)			
Variable	Category	% year 4 sample	% year 8 sample
Mathematics			
Gender	Male	47	51
	Female	53	49
Ethnicity	Other (Pākehā and others)	70	76
	Māori	20	14
	Pasifika	10	10
Main language at home	English	86	84
	Other	14	16
Reading			
Gender	Male	51	48
	Female	49	52
Ethnicity	Other (Pākehā and others)	70	75
	Māori	18	18
	Pasifika	12	7
Main language at home	English	84	89
	Other	16	11
Writing			
Gender	Male	48	53
	Female	52	47
Ethnicity	Other (Pākehā and others)	69	74
	Māori	20	17
	Pasifika	11	9
Main language at home	English	86	86
	Other	14	14
SCHOOL VARIABLES			
Variable	Category	% year 4 sample	% year 8 sample
Geographic Zone	Greater Auckland	36	42
	Other North Island	44	35
	South Island	20	23
Community Size	Small (< 10,000)	18	19
	Medium (10,000 – 100,000)	16	19
	Large (> 100,000)	66	62
School Decile	Deciles 1-3	24	14
	Deciles 4-7	40	46
	Deciles 8-10	36	40
Size of School	Small (< 25 y4 students)	9	
	Medium (25 – 60 y4 students)	59	
	Large (> 60 y4 students)	32	
	Small (<35 y8 students)		14
	Medium (35 – 150 y8 students)		34
	Large (> 150 y8 students)		52
Type of School	Contributing	64	1
	Full Primary	36	25
	Intermediate		47
	Composite (y1-15)		8
	Restricted Composite (y7-10)		3
	Secondary (y7-15)		16

Appendix B: Attitudes to subjects

Table B1 Survey responses to "What subjects do you like best at school?"

Percentages of Students Rating Subjects Among Their Three Favourites	Year 4				Year 8			
	2010	('06	'02	'98)	**2010**	('06	'02	'98)
Physical Education	54	(60	57	67)	64	(70	62	69)
Mathematics	45	(31	36	36)	29	(26	28	30)
Reading	40	(21	29	23)	22	(16	18	15)
Writing	33	(19	21	16)	17	(9	7	12)
Visual Art	27	(66	71	72)	26	(39	49	47)
Science	21	(18	26	20)	14	(16	21	23)
Music	19	(20	26	24)	21	(18	25	19)
Dance	16	(22	-	-)	12	(17	-	-)
Drama	14	(16	-	-)	18	(20	-	-)
Technology	11	(11	10	15)	47	(41	48	39)
Māori	6	(5	8	10)	6	(6	6	8)
Speaking	3	(3	2	5)	3	(5	10	11)
Health	1	(2	2	2)	5	(3	6	2)
Social Studies	1	(2	3	5)	9	(11	10	14)

** Subjects ranked in order of 2010 Y4 preferences*

Appendix C: Statistical examination of the conceptual clusters for writing, reading and mathematics

Writing

The conceptual clusters for Group A tasks (the focus group) were verified statistically by examining the inter-correlations of the component tasks and the cluster scores and the inter-correlations between the clusters. To be statistically strong clusters, we would expect to see the correlations between the component tasks and their cluster scores to be relatively high; and for the inter-correlations between the clusters to be positive and less strong – indicating somewhat different but related concepts.

Table C1 Correlations of components tasks with their respective cluster scores

Task No.	Surface Features		Task No.	Deep Features	
	Year 4	Year 8		Year 4	Year 8
W01a	.68	.72	W09a	.79	.77
W01b	.51	.45	W09b	.68	.76
W02	.76	.78	W12	.61	.56
W10	.88	.66	W13	.62	.57
W23c	.69	.69	W23a	.47	.39
W25		.80	W23b	.76	.67
W26		.84	W23d	.67	.60
			W11		.74
			W24		.69
Median	**.69**	**.72**		**.67**	**.67**

Note. Only one task assessed demonstrating understanding

The median correlations of task components to the surface features cluster score at year 4 and year 8 were .69 and .72 respectively; while those for the deep features cluster score were slightly lower at .67. These indicate that the component tasks were in the main strongly related to the cluster score to which they were contributed. Deep and surface feature cluster scores were equally strongly related to each other and the relationship of each of these clusters with demonstrating understanding were slightly weaker. All correlation coefficients were statistically significant (Table C2).

Table C2 Correlations between cluster scores for year 4 (and year 8) students

	Deep Features	Demonstrate Understanding
Surface features	.70 *(.72)*	.48 *(.48)*
Deep features		.41 (*.47)*

A factor analysis allows one to examine how tasks group together statistically in such a way as to maximise the amount of variance accounted for in the tasks. A principal components factor analysis with varimax rotation on Group A writing tasks revealed two factors at year 4 accounting for 48.7 percent of the variance and three factors at year 8 accounting for 52.2 percent of the variance (Table C3). For both groups 'Dream Place' – a complex writing task involving planning, surface features, deep features and overall expressiveness was one factor that was distinct from one other factor at year 4 (that comprised all other tasks) and from two other factors at year 8 (that comprised surface features and deep features separately).

Table C3 Factor analysis of Group A writing tasks and the percent of variance accounted for

Factor	Year 4	% of Variance	Year 8	% of Variance
1	Surface & deep features	27.1	Surface features	19.1
2	'Dream Place'	21.6	Deep features	18.4
3			'Dream Place'	14.7

Collectively these findings suggest that the three clusters are all strongly related to the construct of writing. A complex task like Dream Place that consists of both surface and deep feature scores reaffirms this. However, for the purposes of reporting students' performance in writing, it is useful to distinguish between these aspects of writing, particularly as they are framed this way in the NZC and National Standards.

Reading

The conceptual clusters were examined statistically by correlating the component tasks with the respective cluster scores (Table C4). The median correlations for year 4 and year 8 for vocabulary were .79 and .83 respectively; for literal comprehension they were .73 and .62 respectively; for deep comprehension .80 and .64; for oral/decoding .84 and .57. All tasks correlated at a statistically significant level with their respective cluster scores. Correlations between cluster scores ranged between .48 and .71 (Table C5). All were statistically significant.

Table C4 Reading: Correlations of components tasks with their respective cluster scores

Cluster	Task	Correlation	
		Year 4	Year 8
Vocabulary	R07	0.86	0.86
	R08	0.79	0.83
	R15	0.74	0.64
	Median	**0.79**	**0.83**
Literal comprehension	R05	0.53	0.46
	R11	0.83	0.72
	R12	0.70	0.46
	R13	0.76	0.62
	R17		0.83
	Median	**0.73**	**0.62**
Deep comprehension	R05	0.91	0.77
	R14		0.61
	R16		0.62
	R18	0.59	0.66
	Median	**0.80**	**0.64**
Oral/decoding	R04	0.74	0.78
	R06	0.94	0.35
	Median	**0.84**	**0.57**

Table C5 Reading: Correlations between cluster scores for year 4 (and year 8) students

	Vocabulary	Literal Comprehension	Deep Comprehension
Oral/decoding	.71 *(.55)*	.66 *(.62)*	.48 *(.48)*
Vocabulary		.66 *(.51)*	.58 *(.50)*
Literal comprehension			.58 *(.61)*

The factor analysis of reading tasks revealed two factors accounting for 33.2 percent and 21.0 percent of the variance respectively at year 4 (Table C6). The first factor was related to oral/decoding, vocabulary and literal comprehension; the second factor was related to deep comprehension assessed by one particular task. At year 8, three factors emerged: the first accounting for 19.2 percent of the variance; the second 16.7 percent and the third 13.4 percent. The first factor was related to oral/decoding and literal comprehension; the second factor was related to vocabulary; and the third to deep comprehension.

Table C6 Factor analysis of Group B reading tasks and the percent of variance accounted for

Factor	Year 4	% of Variance	Factor	Year 8	% of Variance
1	Oral/decoding, Vocab Literal comprehension	33.2	**1**	Oral/Decoding, Vocab	19.2
2	Deep comprehension	21.0	**2**	Literal comprehension	16.7
			3	Deep comprehension	13.4

These analyses provide some modest support for the conceptual clusters generated.

Mathematics

The conceptual clusters for Group C tasks (the focus group) were verified by examining the inter-correlations of the component tasks and the cluster scores (Table C7).

Table C7 Mathematics: Correlations of components tasks with their respective cluster scores

Task No.	Number and Algebra		Task No.	Geometry and Measurement	
	Year 4	Year 8		Year 4	Year 8
M07	.80	.69	M15	.66	
M08	.55	.53	M16	.86	.76
M09	.49	.69	M38	.62	.55
M18	.60	.64	M17		.82
M21	.52	.71	M19		.67
M28	.79	.86			
M29	.66	.72			
M30	.60	.40			
M33	.81	.72			
M36	.72	.56			
M31		.66			
M32		.78			
M34		.67			
M35		.50			
M37		.83			
Median	**.63**	**.69**	**Median**	**.66**	**.72**

The median correlations of task components to the number and algebra cluster score at year 4 and year 8 were .63 and .68 respectively; while those for the geometry and measurement cluster score were .66 and .72. These indicate that the components tasks were in the main strongly related to the cluster score of which they were contributed. This is due to there being far more number and algebra tasks (15) than geometry and measurement tasks (5). Therefore, the total mathematics score is a reflection of number and geometry.

Factor analyses revealed one general factor at year 4 accounting for 43.8 percent of the variance, and two factors at year 8 accounting for 48.1 percent of the variance. The two factors could be broadly described as the two clusters: number and algebra, and geometry and measurement, although there was some overlap in the cluster tasks that fell into each factor (Table C8).

Table C8 Factor analysis of Group C mathematics tasks and the percent of variance accounted for

Factor	Year 4	% of Variance	Factor	Year 8	% of Variance
1	Mathematics	43.6	**1**	Number and algebra	28.9
			2	Geometry and measurement	19.2

We can conclude that there is only weak statistical support for the conceptual clusters that form the basis of reporting mainly due to the uneven numbers of tasks in each cluster.

Appendix D: Mean, standard deviation and N for each population group in writing, reading and mathematics

Table D1 Mean, standard deviation and N for each demographic subgroup in writing for year 4 and year 8

		Year 4			Year 8		
Cluster	Comparison	Mean	SD	N	Mean	SD	N
Gender	Male	62.14	19.84	184	142.33	35.51	162
	Female	72.23	21.28	214	156.30	32.90	158
Ethnicity	Other	70.92	20.90	283	156.04	32.00	241
	Māori	62.65	19.87	75	132.06	35.57	52
	Pasifika	53.05	18.08	40	121.52	34.52	27
School Decile	High	73.54	19.80	157	161.43	30.29	131
	Medium	68.09	21.56	156	144.78	33.46	143
	Low	55.59	18.11	85	128.33	38.85	46
Geographic Zone	North Island	67.76	21.36	167	150.62	34.00	136
	Auckland	70.26	21.20	151	146.94	38.17	109
	South Island	62.08	21.20	80	150.03	31.68	75
Community Size	Small	64.24	20.36	67	151.46	29.10	61
	Medium	65.19	23.37	64	143.14	33.59	59
	Large	68.97	20.81	267	150.35	36.80	200
School Size	Small	63.31	19.09	32	147.37	35.94	41
	Medium	64.82	21.15	234	152.48	34.92	114
	Large	73.47	20.69	132	147.44	34.68	165
School Type	Contributing	69.30	21.37	253			
	Full Primary	64.54	20.64	145	146.15	36.57	74
	Intermediate				145.30	35.92	149
	Secondary				154.41	31.65	56
Language at Home	English	67.77	21.13	335	150.48	32.99	277
	Other	66.12	22.46	58	133.81	31.00	36

Table D2 Mean, standard deviation and N for each demographic subgroup in reading for year 4 and year 8

		Year 4			Year 8		
Cluster	Comparison	Mean	SD	N	Mean	SD	N
Gender	Male	57.39	16.22	145	99.44	16.51	128
	Female	60.45	15.94	146	103.58	13.45	120
Ethnicity	Other	62.29	15.52	203	103.68	14.01	197
	Māori	55.81	14.26	54	93.79	17.75	42
	Pasifika	43.79	12.77	34	88.11	9.78	9
School Decile	High	66.12	13.73	106	105.76	13.31	116
	Medium	58.39	16.32	118	97.02	15.93	112
	Low	48.48	13.28	67	101.15	15.06	20
Geographic Zone	North Island	60.07	15.87	122	98.80	15.25	96
	Auckland	56.85	16.59	119	103.09	14.96	89
	South Island	61.06	15.36	50	103.13	15.21	63
Community Size	Small	58.04	14.13	57	100.92	16.04	51
	Medium	59.71	18.24	34	102.70	14.80	40
	Large	59.05	16.35	200	101.29	15.14	157
School Size	Small	56.53	17.57	15	104.39	15.88	38
	Medium	58.27	16.70	169	100.23	15.29	87
	Large	60.29	15.01	107	101.38	14.97	123
School Type	Contributing	59.00	16.63	198			
	Full Primary	58.76	15.10	93	103.70	14.76	64
	Intermediate				100.68	15.52	108
	Secondary				100.30	16.06	46
Language at Home	English	61.30	15.55	239	101.90	15.55	210
	Other	48.08	14.46	50	97.75	14.14	24

Table D3 Mean, standard deviation and N for each demographic subgroup in mathematics for year 4 and year 8

		Year 4			Year 8		
Cluster	Comparison	Mean	SD	N	Mean	SD	N
Gender	Male	41.36	14.93	195	95.03	22.38	158
	Female	38.63	13.33	216	89.41	19.94	142
Ethnicity	Other	43.04	13.65	290	95.95	20.09	244
	Māori	33.40	12.28	84	79.76	19.26	37
	Pasifika	30.35	13.05	37	70.84	20.93	19
School Decile	High	46.12	14.16	153	99.24	17.63	139
	Medium	38.21	12.87	164	79.28	22.63	32
	Low	32.85	12.15	94	88.21	22.37	129
Geographic Zone	North Island	40.31	14.44	181	91.52	21.93	120
	Auckland	39.33	14.86	150	79.28	22.63	32
	South Island	40.18	12.20	80	92.60	22.47	102
Community Size	Small	37.89	13.46	73	93.56	18.23	66
	Medium	40.18	12.20	80	91.30	20.01	44
	Large	38.79	13.12	67	92.20	22.79	190
School Size	Small	35.23	15.11	31	88.24	23.17	41
	Medium	39.25	14.03	239	93.13	21.36	102
	Large	42.11	13.90	141	92.95	20.99	157
School Type	Contributing	39.93	14.15	268			
	Full Primary	39.94	14.24	143	91.87	21.58	67
	Intermediate				91.43	22.08	146
	Secondary				94.26	19.87	54
Language at Home	English	40.76	14.11	346	93.94	19.96	248
	Other	34.59	13.48	59	84.51	26.63	41