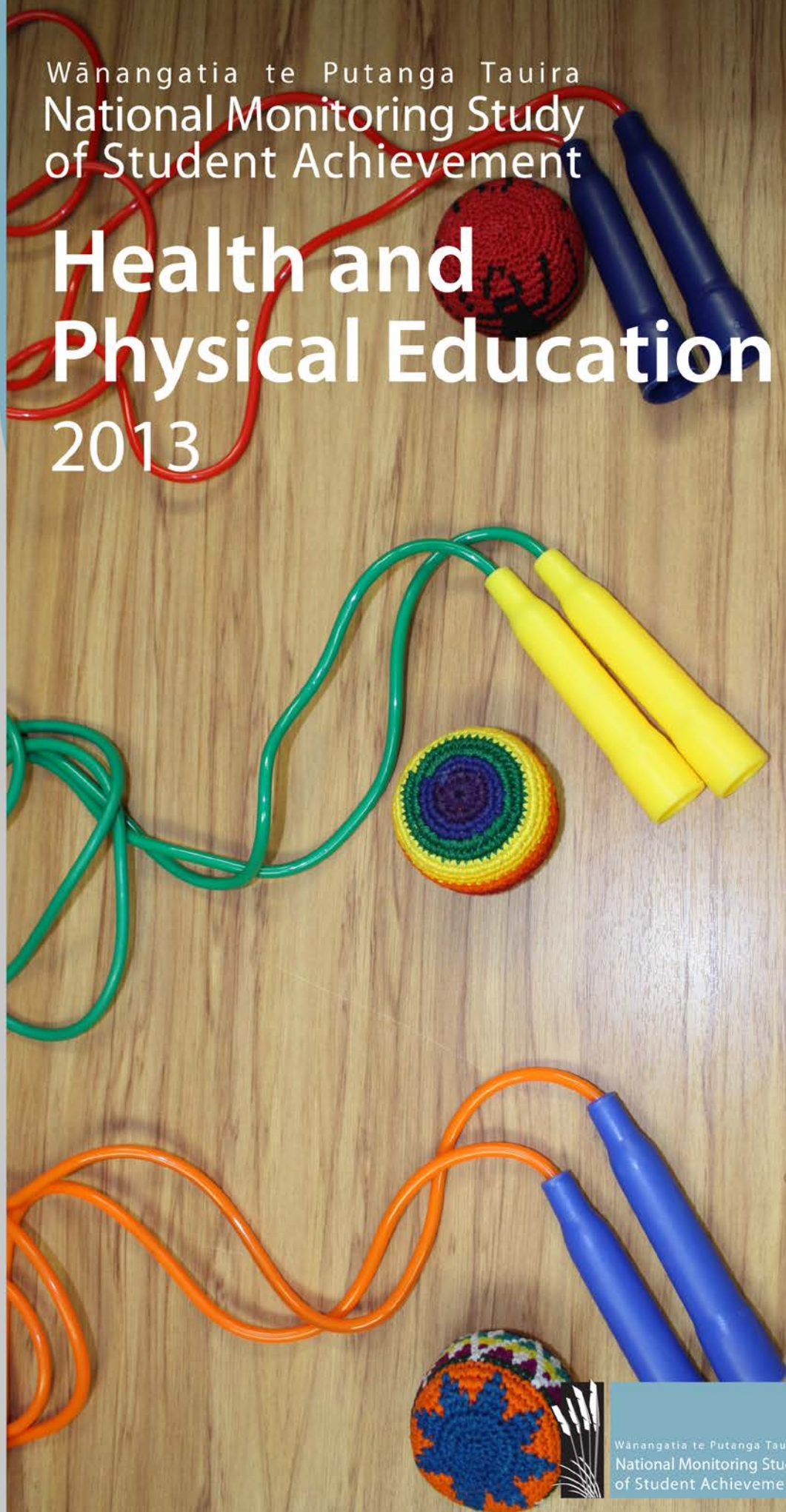


Wānangatia te Putanga Taurira  
National Monitoring Study  
of Student Achievement

# Health and Physical Education 2013





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of Student Achievement

# Health and Physical Education 2013

Educational Assessment Research Unit  
and  
New Zealand Council for Educational Research

Confidential Draft



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### Report 3

National Monitoring Study of Student Achievement, Health and Physical Education 2013

ISSN: 2350-3254 (Print)

ISSN: 2350-3238 (Online)

ISBN: 978-1-927286-04-3 (Print)

ISBN: 978-1-927286-05-0 (Online)

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# Acknowledgements

The NMSSA project team wishes to acknowledge the very important and valuable support and contributions of many people to this project, including:

- Members of the reference groups: Technical, Māori, Pasifika, and Special Education
- Members of the curriculum advisory panels in health and physical education and mathematics and statistics
- Principals and students of the schools where the tasks were piloted and trials were conducted
- Principals, teachers and Board of Trustees members of the schools who participated in the 2013 main study including the linking study
- The children who participated in the assessments and their parents, whānau and caregivers
- The teachers who administered the assessments to the children
- The teachers, senior initial teacher education students and others who undertook the marking
- The Ministry of Education Research Team and Steering Committee

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# Executive Summary

The National Monitoring Study of Student Achievement (NMSSA) – Wānangatia Te Putanga Tauira – is designed to assess and understand student achievement across the New Zealand Curriculum (NZC) at Year 4 and Year 8 in New Zealand’s English-medium state schools. The main purposes of NMSSA are:

- to provide a snapshot of student achievement against the NZC;
- to identify factors that are associated with achievement;
- to assess strengths and weaknesses across the curriculum;
- to measure change in student achievement over time; and
- to provide high quality, robust information for policy makers, curriculum planners and educators.

NMSSA began in 2012 and is carried out over a five-year cycle. It focuses on two learning areas of the NZC each year. During the first cycle we are setting the baseline for measuring change in student achievement over time in subsequent cycles. This report is the full technical report of the national level findings from NMSSA prepared for the Ministry of Education.

In 2013 the National Monitoring Study of Student Achievement (NMSSA) assessed student achievement in two learning areas of the NZC – health and physical education, and mathematics and statistics. This report focuses on health and physical education. Physical Education is referred to as ‘PE’ in tables and graphs, and the titles of tables and graphs.

The NZC expresses learning expectations in health and physical education as achievement objectives that describe the knowledge and skills students should be able to display as they progress from one curriculum level to the next. Each level builds on the one before, as well as introducing new ideas and skills. Learning objectives are presented across four strands: personal health and physical development, movement concepts and motor skills, relationships with other people, and healthy communities and environments.

NMSSA assessed achievement in health and physical education in two ways: by using a measure of Critical Thinking in Health and Physical Education; and descriptive reporting of students’ understanding of well-being, and the demonstration of a range of movement and strategic action skills within the contexts of games, and movement sequences. The Critical Thinking in Health and Physical Education achievement measure was aligned to the levels of the NZC. Other data related to students’, teachers’ and principals’ views of teaching and learning in health and physical education were also collected via questionnaires.

The NZC sets out the requirements for different levels of the curriculum in each learning area. The expectations for student learning at Level 2 of health and physical education are that students should be able to describe or be familiar with basic concepts in these areas. A student may be able to achieve at Level 2 on the basis on family/whānau experiences outside school, whole school learning, or other forms of prior knowledge. The results from NMSSA’s 2013 study showed that over 95 percent of students at Year 4 were achieving at Level 2 of the NZC. Level 4 of the curriculum is naturally more demanding: students are expected to be able to explain and discuss or demonstrate knowledge and understanding of particular concepts. To achieve at Level 4 of the curriculum students need to have been exposed to specific health and physical education teaching. A similar pattern may also occur in learning areas such as science and social studies. The 2013 study suggests that by Year 8 only 50 percent of students were achieving at Level 4 of the curriculum.

There was considerable variation in performance at both Year 4 and Year 8, as well as a level of overlap between score distributions for each year level. The difference in achievement (‘progress’) between Year 4 and Year 8 was smaller than that recorded for NMSSA Mathematics (2013) or Writing (2012), and similar to that reported for Science (2012). In considering these findings it is important to understand both the requirements of the NZC and the context in which learning occurs for health and physical education.

Socio-economic factors were strongly associated with performance. This pattern was similar to findings in NMSSA 2012, for both Science and Writing (and in previous NEMP reports). On average, students from low decile schools (deciles 1, 2 and 3) scored lower than those who attended high decile schools (deciles 8, 9, and 10). At each year level, the difference in average scores between these groups was equivalent to the amount of progress expected over about two years of schooling. On average, NZ European students scored at higher levels on the Critical Thinking in Health and Physical Education measure than Māori and Pasifika students at each year level. Although Māori and Pasifika students were more likely to attend low and mid decile schools, analyses showed that differences due to ethnicity (NZ European, Māori and Pasifika) were observable after decile was taken into account.

Girls and boys performed equally well on the Critical Thinking in Health and Physical Education measure at each year level, as did students from different types of school.

Students demonstrated a broad understanding of well-being that extended beyond the physical dimension. A high proportion of students were able to describe mental/emotional and social dimensions, although a much smaller proportion described a spiritual dimension to well-being.

Students' movement skills developed considerably from Year 4 to Year 8. Boys scored higher on a range of movement skills, and strategic action skills that included rotation, agility, and balance in the context of games. Girls scored slightly higher on performing movement sequences skills that included control and use of equipment, change of pace, level, and use of their bodies, as well as variations in movements, and use of space. Students in high decile schools scored higher on the range of movement and strategic action skills, and markedly higher on the movement sequences skills. These gender and decile differences in movement skills are longstanding and were also observed through the NEMP studies.

The study provides some evidence, based on the specific survey items used by NMSSA, that contextual factors such as attitudes towards health and physical education, and learning experiences at school are only weakly related to student achievement.

In general, physical education had a higher priority in schools' teaching programmes than health (being ranked 7<sup>th</sup>/8<sup>th</sup> compared to 11<sup>th</sup>/12<sup>th</sup> out of 17 aspects of learning areas). Priorities differed by school decile. At Year 4, a greater proportion of low decile schools placed a high priority on health and physical education while at Year 8, similar proportions of low, mid and high decile schools assigned both high and low priorities to health and physical education. Due to these decile differences in priority ranking it was not possible to determine if a relationship existed between school priority ranking and achievement in health and physical education.

Teachers reported relatively high levels of professional development and support. Over two thirds of teachers had received professional development in health and physical education in the last two years compared to one third in Science (NMSSA, 2012)<sup>1</sup>. Teachers also reported higher confidence and enjoyment in their teaching of health and physical education than was the case for NMSSA English: writing or Science (2012)<sup>2</sup>. The most frequently cited source of support for classroom teaching was external providers.

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<sup>1</sup> National Monitoring Study of Student Achievement, Science 2012, Educational Assessment Research Unit, Otago University and the New Zealand Council for Educational Research

<sup>2</sup> National Monitoring Study of Student Achievement, Writing 2012, Educational Assessment Research Unit, Otago University and the New Zealand Council for Educational Research.



# 1 Overview of the National Monitoring Study of Student Achievement

## 1. Purpose of national monitoring

The National Monitoring Study of Student Achievement (NMSSA) – Wānangatia Te Putanga Tauira – is designed to assess and understand student achievement across the curriculum at Year 4 and Year 8 in New Zealand’s English-medium state schools. The main purposes of NMSSA are:

- To provide a snapshot of student achievement against the New Zealand Curriculum (NZC);
- To identify factors that are associated with achievement;
- To assess strengths and weaknesses across the curriculum;
- To measure change in student achievement over time; and
- To provide high quality, robust information for policy makers, curriculum planners and educators.

The information on educational outcomes and associated factors that is provided through NMSSA will continue the monitoring undertaken by the National Education Monitoring Project (NEMP) between 1995 and 2010 and complement international studies such as the Trends in International Mathematics and Science Study (TIMSS) and the Progress in International Reading Literacy Study (PIRLS) and other national evaluation studies.

The project covers all areas of the NZC, and includes a focus on both key competencies and literacy and mathematics across the curriculum. NMSSA has a particular focus on Māori students, Pasifika students and students with special education needs.

Contextual information is collected to help understand the factors that are associated with student achievement. This includes students’ attitudes to, and the opportunities to learn in, the specific learning area being investigated, as well as features of their educational experiences at school and home that support their learning. Teachers provide information about factors such as their confidence to teach the specific learning area under investigation, learning opportunities provided to students, and the professional and curriculum support they receive.

Each year NMSSA focuses on two learning areas. During the course of a cycle, all learning areas of the curriculum, as well as cross-curriculum elements such as key competencies and literacy and mathematics across the curriculum, will be monitored. Annual reports of student achievement and factors associated with each learning area will be compiled. Trends and changes in student achievement within learning areas will be monitored through subsequent cycles. While aspects of student achievement on the key competencies and literacy and mathematics across the curriculum will be assessed each year, reports on these aspects will be produced at the end of each cycle rather than annually (see <http://nmssa.otago.ac.nz/>).

The project is supported by advisory panels of curriculum experts, reference groups for the priority learner groups (Māori, Pasifika and special education needs), and a technical reference group.

## 2. The 2013 Study

In 2013, the dual focus for the NMSSA study was mathematics and statistics, and health and physical education (PE). A nationally representative sample of approximately 2000 students at each year level took group-administered paper-and-pencil assessments in mathematics and statistics, and responded to questions about their attitudes, learning experiences and support for learning. A nationally representative sub-sample of approximately 800 students at each year level also took part in individual assessments in health and physical education through one-to-one video-recorded interviews and performance activities. Trialing revealed that paper-and-pencil assessment did not permit a sufficiently valid assessment of the learning area. Individual assessments were also used for assessing aspects of learning in mathematics and statistics.

The assessments were conducted during Term 3 by experienced, specially trained classroom teachers, with sound cultural awareness. Monitoring procedures ensured consistent and high quality administration of assessments and marking. The characteristics of the achieved samples are described in Appendix 1.

As well, at each year level, up to three teachers from each of the schools involved in the study were invited to respond to a questionnaire about their confidence in teaching mathematics and statistics, and health and physical education, learning opportunities provided for students, and professional support they received for teaching these learning areas. Principals were invited to respond to a questionnaire about priority learning areas within the school, and the arrangements for teaching the focus learning areas.

## 3. Structure of the health and physical education report

The report of student achievement in health and physical education is set out in seven chapters:

- Chapter 1 provides a broad overview of the National Monitoring Study of Student Achievement programme.
- Chapter 2 provides an overview of the the health and physical education learning area and sets out the development of the achievement measures and data collection instruments. The analytical and reporting approaches used to present the findings are also set out in this chapter.
- Chapter 3 presents the findings for Year 4 and Year 8 student achievement and reports these against levels of the NZC health and physical education using a NMSSA Critical Thinking in Health and Physical Education scale. It also compares achievement between Year 4 and Year 8 students, and differences between sub-groups of gender, ethnicity, school decile and type of school. Students' understanding of well-being, and their ability to perform a range of movement skills, strategic actions within the context of authentic games, and movement sequences are reported separately and descriptively.
- Chapter 4 examines factors that may be associated with student achievement in health and physical education and draws on information collected from students about their attitudes to health and physical education, their learning experiences in health and physical education at school and their involvement in physical activities outside of school. This is examined alongside information collected from teachers about their confidence to teach health and physical education, the learning experiences they provide for students, professional support they receive for teaching health and physical education and the school learning priorities.
- Chapter 5 reports the achievement of Māori students in health and physical education for Year 4 and Year 8 students, and for sub-groups by gender, school decile and type of school. The characteristics of Māori students who achieve above the benchmark (the national average) are examined in relation to gender, attitude to health, attitude to physical education and school decile.
- Chapter 6 presents the achievement of Pasifika students in health and physical education in a parallel way to Māori students in Chapter 5.
- Chapter 7 reports the participation and achievement of students who have special education needs. Achievement, attitudes to health and physical education, and opportunities to learn health and physical education are also contrasted with those for students with no special education needs. The profile of students with special education needs who score above the benchmark are examined in relation to gender, attitude to health, attitude to physical education and school decile.

# 2 The NMSSA Health and Physical Education Assessment Programme

This chapter provides an overview of the NMSSA assessment programme for health and physical education. It includes seven parts.

- Part 1 describes health and physical education in the New Zealand Curriculum (NZC).
- Part 2 sets out the health and physical education assessment overview for NMSSA.
- Parts 3 and 4 describe the components of the assessment programme, design processes, the scale developed for reporting health and physical education achievement, movement achievement tasks, and other assessment information collected.
- Parts 5 and 6 describe the instruments for gaining student, teacher and principal perspectives on learning and teaching health and physical education in their schools.
- Part 7 provides information about the data analysis and how the findings are reported.

## 1. Assessing health and physical education performance in New Zealand

The aim of the 2013 NMSSA health and physical education study was to assess and begin to understand the achievement and progress of Year 4 and Year 8 students in this learning area of the NZC.

The NZC provides a framework rather than a detailed plan for teaching and learning. Schools are expected to determine the detail of their own school-based curriculum, while staying clearly aligned with the intent of the NZC document. According to the NZC document (p. 37), the NZC

... gives schools the scope, flexibility, and authority they need to design and shape their curriculum so that teaching and learning is meaningful and beneficial to their particular communities of students. In turn, the design of each school's curriculum should allow teachers the scope to make interpretations in response to the particular needs, interests, and talents of individuals and groups of students in their classes.

At the core of the health and physical education learning area are four interdependent concepts: hauora, attitudes and values, socio-ecological perspective and health education. The learning area covers four strands: personal health and physical development, movement concepts and motor skills, relationships with other people, and healthy communities and environments. The achievement objectives of the health and physical education learning area have as their focus the well-being of the students, of other people, and of society through learning in and about health-related and movement contexts. Seven key areas of learning (KALS) provide the contexts for learning in health and physical education: physical activity, sport studies, mental health, food and nutrition, body care and physical safety, sexuality education, and outdoor education.

Health and physical education encompasses three different but related aspects: health education, physical education, and home economics. Through health education students develop and use a range of “skills and understandings to take critical action to promote personal, interpersonal and societal well-being” (NZC, p.23). Through physical education students are encouraged to “engage in movement experiences that promote and support the development of physical and social skills. It fosters critical thinking and action...” (NZC, p. 23) Through home economics students “develop personal and interpersonal understandings and skills that contribute to well-being” (NZC, p. 23).

At Level 2 the expectations of students are at a more exploratory, experiential level. Students at Year 4 should be able to ‘describe’, ‘experience’, ‘identify’, ‘practise’, ‘participate in’, ‘use’, ‘develop and apply’, ‘express’, ‘explore’, and ‘contribute to’ aspects focused around themselves and groups. At Level 4 there is an increasing expectation to engage with specific knowledge, skills and understandings. Year 8 students should also be able to ‘demonstrate’, ‘access and use’, ‘recognise’, ‘investigate’ and ‘specify’ aspects focused more around at the level of others and the community.

The 2013 NMSSA health and physical education study complements the precursor to NMSSA, the National Education Monitoring Project (NEMP).

The NEMP project was carried out by the University of Otago for the Ministry of Education. The project began in 1995 and assessed the achievement of New Zealand Year 4 and Year 8 students in all areas of the school curriculum. NEMP conducted monitoring in health and physical education at four-yearly intervals commencing in 1998. NEMP’s last report on health and physical education<sup>3</sup> discussed data collected in the 2006 school year. The report noted that Year 8 students scored higher on tasks than those in Year 4, particularly in terms of the knowledge and understandings in health of personal health and development, relationships with others, healthy communities and environment, and in movement skills (PE). There were very slight gains between 2002 and 2006, but more notably in Year 8 students’ understanding of relationships with other people. NEMP reported differences between key population sub-groups by averaging effect size differences across the series of tasks used to assess achievement in the study. Table 2.1 shows the average effect size differences reported for gender and ethnicity in 2006.

Table 2.1 Effect size differences between sub-groups reported by NEMP in 2006

	Health		Movement Skills	
	Year 4 Effect Size	Year 8 Effect Size	Year 4 Effect Size	Year 8 Effect Size
<b>Gender</b>				
Boys/Girls	-0.09	-0.20	0.10	0.10
<b>Ethnicity<sup>4</sup></b>				
Pākehā/ Māori	0.25	0.23	-0.09	-0.06
Pākehā/Pasifika	0.26	0.32	-0.09	0.10

Socio-economic effects were evident. Students in high decile schools (deciles 8, 9 and 10) did better than students in other decile schools on just over 40 percent of the health tasks and on about 30 percent of the movement skills tasks.

<sup>3</sup> Flockton, L. & Crooks, T., (2007). NEMP: Health and Physical Education Results 2006. National Education Monitoring Report 40. Dunedin: University of Otago, Educational Assessment Research Unit.

<sup>4</sup> NEMP defined three ethnicity categories for use in the study: Māori Pākehā and Pasifika. Pākehā was used for all students not defined as Māori and Pasifika.

## 2. The NMSSA health and physical education assessment overview

An advisory panel of health and physical education experts met with the NMSSA team to consider the health and physical education learning area of the NZC, including literacy and mathematics demands and opportunities to develop key competencies. The panel also identified key contextual questions to better understand students' achievement in health and physical education. In addition, the discussion with the advisory panel considered the aspects of the health and physical education achievement objectives that could reasonably be assessed through NMSSA. The advice from the advisory panel formed the basis for the NMSSA health and physical education assessment overview.

The advisory panel identified three important conceptual areas encompassed within the learning area of health and physical education: critical thinking, critical action, and creative thinking.

Critical thinking includes thinking about:

- self and others: Understanding different perspectives and points of view, justifying one's opinions and attitudes;
- information: Examining, analysing, critiquing, and challenging information;
- society: Understanding the impacts of (social, environmental, economic, political, cultural) determinants on well-being.

Critical action includes action for:

- self: An understanding of strategies and the ability to manage healthy lifestyles and relationships, risk and resilience etc;
- others: The ability to plan and engage in health promotion to bring about change as individuals and collectively.

Creative thinking supports and enhances well-being for oneself and others and includes:

- an understanding of visioning and big picture thinking;
- the ability to engage in problem solving and find solution;
- an ability to express oneself through movement and to interpret the movement of others.

These conceptual areas provided the foundation for the assessment overview that is set out in Table 2.2. Several 'big questions' identified the important or significant issues to explore in health and physical education. These led to a number of more 'specific questions' relating to (i) assessing achievement in health and physical education and (ii) understanding achievement in health and physical education. The specific questions were used to guide the development of the different components that made up the NMSSA health and physical education assessment programme. The overview was used to guide and prioritise the development of the different components that made up the NMSSA health and physical education assessment programme.

The achievement objectives of health and physical education study formed the basis of the assessment programme and the assessment tasks the students participated in. As NMSSA is conducted in randomly selected schools across the country, it is impractical for us to place emphasis on those aspects of health and physical education that require specialist equipment and/or facilities that are not available at all schools. As a result, the 2013 assessment programme did not include the practical cooking of food as part of the home economics focus or the assessment of swimming as part of the focus of physical education. Achievement objectives relating to home economics were covered in a task related to eating together while those related to swimming were covered in a task related to water safety. These assessment tasks covered critical thinking and critical action. This is explained further in the following section.

Table 2.2 The Health and PE Assessment Overview

**Big questions**

- To what extent have students developed the knowledge, skills and movement capabilities, understandings, motivations, attitudes, and values to reflect on the nature of well-being and take action to promote their own and others' well-being?
- To what extent do students demonstrate these understandings across diverse health- and movement-related contexts?
- To what extent do contextual factors influence the development of knowledge, skills and movement capabilities, understandings, motivations, attitudes, and values?
- To what extent do students demonstrate progress in health and PE between Year 4 and Year 8?

**Assessing achievement: specific questions**

Reflecting on the nature of well-being

- What are students' understandings about the inter-relationships between health, well-being, and movement?
- To what extent do students recognise the factors that influence their health and well-being, and that of others in their community, and determine possible action to enhance and promote well-being?
- What understandings about strategies have students developed to maintain their well-being?
- How do students interpret health and physical activity/movement messages and to what extent are they able to critique and prioritise and act on these messages?

Taking action to promote well-being across a range of contexts

- What strategies and actions do students know about to help promote the well-being of themselves and others?
- To what extent can students use their understandings of the factors that influence their health and well-being, and that of others in their community, to plan and carry out health-promoting actions? (For example, to what extent are students able to bring together their conceptual understandings and their applied understandings to take action?)
- To what extent are students able to demonstrate knowledge and skills for well-being in movement and health-related contexts?

Knowledge skills and understandings in movement contexts

- To what extent are students able to demonstrate knowledge and skills in movement contexts?
- What are students' understandings about why they and others do or do not participate in movement experiences/context?
- To what extent are students able to draw on their own cultural experience and practices in movement experiences/context?

**Understanding achievement: specific questions**

Students

- To what extent do students demonstrate motivation, engagement and interest in learning health and PE?
- What is the nature and range of learning experiences students have in health and PE at school and out of school?
- To what extent do students identify and evaluate movement activities they participate in?
- To what extent have students developed an understanding of the holistic nature of well-being and how aspects of well-being are connected?

Teachers

- How confident do teachers feel to teach health and PE and how well supported are they?
- How confident are teachers in accommodating children with differentiated needs? How do they do this?
- What professional learning and development have teachers had?

Principals

- How do principals rate health and PE as a priority in their school?
- What professional learning and development opportunities has the school provided for teachers?
- How does the school engage with whanau/the wider community with respect to health and physical education?

## Components of the health and physical education assessment programme

A range of assessment tasks were developed to assess the extent to which students were able to reflect on the nature of health and well-being, take action to promote health and well-being across a range of contexts and demonstrate knowledge skills and understandings in movement contexts. All assessments involved an individual assessment approach (teacher assessors interacting with individuals or groups of students) and covered achievement objectives from the four strands of the curriculum and contexts from the seven key areas of learning. In the NMSSA context there are some achievement objectives and some key areas of learning that are more constrained in their assessment opportunities because of the limited knowledge a teacher assessor has of individual students or logistical limitations, e.g. assessing personal growth and development from a sexuality perspective or assessing student skills in aquatics.

The first component focused on the constructs of critical thinking, critical action and creative thinking in health and physical education. It covered the four strands (personal health and physical development, movement concepts and motor skills, relationships with other people, and healthy communities and environments) and the seven key areas of learning (mental health, sexuality education, food and nutrition, body care and physical safety, physical activity, sport studies and outdoor education).

Each of the Key Areas of Learning (KAL) were addressed in the first component, but not all aspects of each KAL were suitable for assessment in the NMSSA context. For example, a Water Safety task was included that assessed physical safety and outdoor education, but it was not feasible to assess aquatic skills. The Eating Together task assessed the area of food and nutrition as part of healthy communities but it was not feasible to assess practical cooking skills. The New School and Magazine Ads tasks assessed mental health, sexuality, and body care and physical safety. However, the advisory panel did not consider it appropriate for NMSSA to assess the aspect of puberty within sexuality.

The assessment framework in Appendix 2 sets out the aspects of the KALs, strands and conceptual understandings (critical thinking, critical action and creative thinking). This component included all items from six tasks and one critical thinking item from a movement skills task. Results were reported on a scale named Critical Thinking in Health and Physical Education. See Part 4 for more details of this scale.

The second component assessed three separately described aspects of health and physical education related to students' understanding of well-being, their demonstration of a range of movement skills in the contexts of authentic games and movement sequences, and the frequency of physical activities engaged in outside of school. These constructs were reported separately and descriptively.

The three remaining components focused on collecting contextual and attitudinal information from students, teachers and principals. Table 2.3 outlines the components.

Each component of the assessment programme is described in more depth in the following sections.

Table 2.3 The components of the 2013 NMSSA Health and PE Assessment Programme

Component	Focus	Assessment Approach
1. Critical thinking in health and PE	Encompasses the three areas of thinking important to health and PE - critical thinking, critical action and creative thinking in relation to themselves and others. The scale is focused primarily on critical thinking and reports of critical action and limited opportunities to assess creative thinking.	Paper-and-pencil One-to-one interviews
2a. Well-being	Student understanding of well-being (hauora)	Paper-and-pencil One-to-one interview
2b. Movement skills	Ability to demonstrate a range of movement skills, strategic action within a game context, and movement sequences.	Activities One-to-one interview
2c. Physical activities	The extent to which students are involved in physical activities outside of school	Interview
3. Student attitudes and opportunities to learn in health and PE	Student attitude towards and engagement with health and PE Student views of opportunities and experiences for learning health and PE at school	Paper-and-pencil questionnaire
4. Teacher and principal perspectives on health and PE teaching and learning in the school	Teacher and principal views of health and PE learning in their school Teacher confidence as health and PE educators Opportunities provided for student learning in health and PE Professional support and learning related to teaching health and PE Curriculum priorities of the school	Paper-and-pencil questionnaire

### 3. The critical thinking in health and physical education assessment

The scope of the assessment of achievement in health and physical education focused on the components described in Table 2.3 above. It included opportunities for using the knowledge, attitudes and values that are expressed as key competencies in the NZC, e.g. thinking; language, symbols and text; and relating to others. Appendix 2 outlines the assessment framework in terms of: the task title, strand, key area of learning, and assessment approach.

In total, 10 NMSSA individual tasks were used to provide coverage of the important aspects of health and physical education as described above.

#### Piloting and trialing of tasks

A series of tasks based on the framework were developed and piloted in Dunedin schools before being used in a NMSSA trial involving schools around New Zealand. The student responses from the pilot and trial were used to refine the tasks and support the development of appropriate scoring guides. An Item Response Theory (IRT) model was also applied to the data after the trial to help refine the tasks, explore the development of a reporting scale and inform the selection of tasks for the main study.



## The 2013 NMSSA health and physical education study

Teacher assessors were trained in the administration of tasks during a five-day training programme prior to the main study. During the study a selection of tasks was administered to eight students in each school. Teacher assessors were carefully monitored and received feedback to ensure consistency of administration. Student responses were captured on video and paper, and stored electronically for marking. Approximately 800 students in the main study completed the tasks in health and physical education at each of Year 4 and Year 8.

### Marking

Teacher markers, some of whom had been teacher assessors, were employed to mark the tasks. All markers were trained, and quality assurance procedures were used to ensure consistency of marking. The marking schedules were refined as necessary to ensure they reflected the range of responses found in the main study. Students' scores were entered directly by the markers into the electronic database.

### Creating the Critical Thinking in Health and Physical Education scale

An IRT model (the Rasch Model) was applied to all student responses from the items/tasks in component one to construct a measurement scale. The scale was named 'Critical Thinking in Health and PE' to highlight the focus of the construct. The full title of the scale is used throughout the report to remind the reader that this is the construct being assessed. The scale locates both student achievement and relative task difficulty on the same measurement continuum using scale scores.

The scale has been constructed so that the average scale score for the combined sample of Year 4 and Year 8 students was 100 scale score units, and the approximate standard deviation for a year level was 20 scale score units. Scale scores ranged from about 20 to 180 scale score units.

Further details about the measurement scale and its construction can be found in Part 6 of this chapter.

### Scale description

Figure 2.1 describes the knowledge and competencies associated with tasks located at different parts of the Critical Thinking in Health and Physical Education scale. The descriptions are provided in three broad bands, along with examples of the task contexts in which the knowledge and competencies were displayed.

To develop the description, the scoring categories associated with each task were located on the scale where scoring in that category was most probable. The demands of each scoring category were examined and used to craft descriptions across three bands of the scale. The descriptions for each band were organised around the three focus areas of the Critical Thinking in Health and Physical Education assessment.

The scale description is used in later chapters to aid interpretation of the data.

## 4. The well-being and movement skills assessment

A paper-and-pencil task followed by a one-to-one interview assessed students' understanding of well-being. Two activity tasks used the context of an authentic game to assess students' performance on a range of movement and strategic action skills, and a further activity task assessed students' movement sequences. The details of the Well-being and Movement Skills tasks and how students' responses were coded are provided in Chapter 3. Student performance on these tasks are reported descriptively and complement the aspects of the learning area not covered by the Critical Thinking in Health and Physical Education scale. The well-being items were not included in the scale because the different range of contexts in which students study well-being meant that it was not possible to construct a task that would be equally accessible to all students. The task used did not ask students to create categories/dimensions of well-being, but classified their open-ended responses using a categorisation based on the Hauora model. The task therefore enabled an exploratory study of students' awareness of different dimensions of well-being.

The movement skills items were not included in the scale (with the exception of one item about strategy) because they did not form part of the construct of critical thinking in health and physical education and psychometrically did not fit on the same scale as the other tasks assessed.

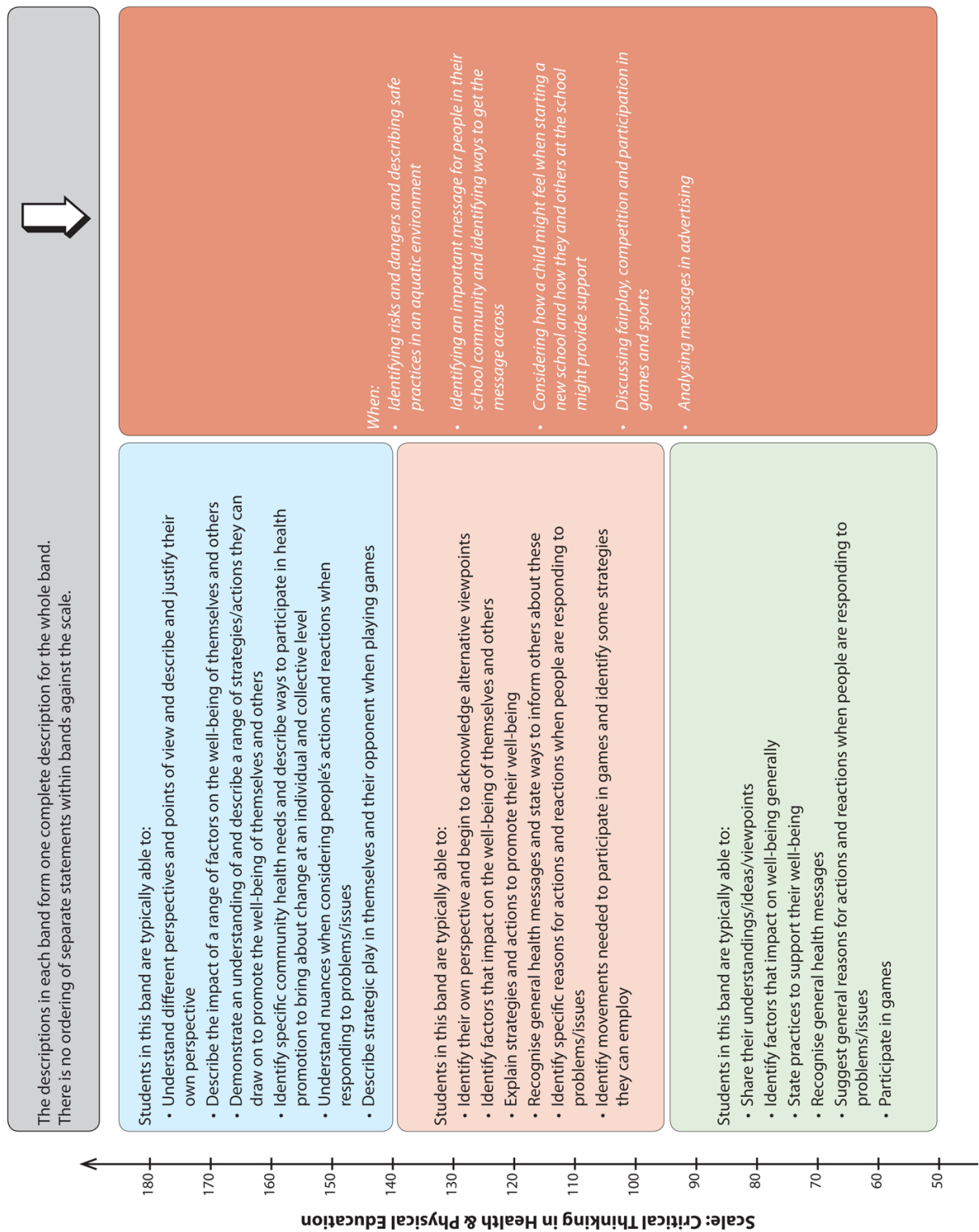


Figure 2.1 Scale description for Critical Thinking in Health and PE

## 5. Student attitudes and learning opportunities in health and physical education

A questionnaire was developed containing sections related to student attitudes towards health and physical education, and how frequently students experience a set of opportunities to learn in these areas. The questionnaire was the same for Year 4 and Year 8 and was administered to all students in the 2013 NMSSA study, approximately 2000 students at each year level.

### Attitudes to health and physical education

Students were asked about their attitudes to health and to physical education in separate sections of the questionnaire. Each section asked students how much they agreed with a number of statements related to their feelings of self efficacy in health and physical education, and level of engagement in health and physical education learning. Students used a four-point agreement scale to respond to each statement ('Do not agree at all', 'Agree a little', 'Agree quite a lot'; and 'Agree heaps'). The statements from the attitude to health section were:

- I usually do well in learning about health.
- I am good at learning about health.
- My teacher thinks I am good at learning about health.
- I think learning about health is interesting.
- I like learning about health at school.
- I would like to learn more about health at school.
- I want to keep learning about health when I grow up.
- I learn useful things in health at school.

The statements from the Attitude to Physical Education section were:

- I usually do well in PE.
- I am good at PE.
- My teacher thinks I am good at PE.
- I think PE is interesting.
- I like doing PE at school.
- I would like to do more PE at school.
- I want to keep learning about PE as I grow up.
- I learn useful things in PE at school.

Draft versions of the attitudes to health and physical education sections were piloted with small groups of students, before being used in a development trial with several hundred students at Year 4 and Year 8. Responses from the trial were analysed using an IRT model and the results used to inform the development of the final set of statements used in the 2013 NMSSA health and physical education study.

After the main study, an IRT model was applied to both sets of attitude questions in order to construct reporting scales. Each scale allows the strength of each student's overall response to the set of statements to be located on a measurement continuum. Students who responded positively to a large number of statements were given high scale scores. Students whose responses were more negative overall received lower scale scores. As with other NMSSA scales, this scale has been set to have an average of 100 scale units and a standard deviation of 20 scale units.

## Opportunities to learn in health and physical education

Two other sections of the questionnaire asked students about the opportunities they had to learn health and physical education respectively. Students used a four-point scale (Not at all, A little, Quite a lot, and Heaps) to show how often they experienced different opportunities to be involved in health and physical education learning activities. The statements from the learning opportunities in physical education section were:

- Use equipment to play and move around.
- Have challenges like making up movement patterns or solving problems.
- Work in teams or groups.
- Learn about playing fair.
- Learn how to be safe when I am moving in different ways.
- Learn new skills and different ways of moving.

The learning opportunities statements in health were:

- Work in groups to think about and discuss things in health
- Learn something in health that is important to me
- Take action to improve my health after learning something in class
- Share things I've learned about health with others (e.g. make a poster, talk to people, write a letter)
- My whole class does things that help me learn about health

Draft lists of learning opportunities were piloted and trialled and a final list for each of health and physical education selected for use in the main study. Results from the 2013 study are reported as the percentages of students selecting the different response categories for each learning opportunity.

## 6. Teacher and principal perspectives on health and physical education teaching and learning in the school

The teacher questionnaire was developed to collect teachers' perspectives on health and physical education teaching and learning in their schools. It included questions related to their confidence as health and physical education educators, the types of health and physical education learning activities and experiences that they provided for their students, and opportunities they had received for professional development.

The principal questionnaire collected principals' perspectives on ranking learning area by the priority given to them within their school, and provisions related to health and physical education teaching and learning in their school.

The questionnaires were piloted with teacher focus groups and interviews with principals from a range of schools before being used in the main study. Up to three teachers in each school in the main study (including specialist teachers of health and/or physical education) and the principal were invited to complete the questionnaires.

## 7. Data analysis and reporting

In this section we provide some technical details about the scales developed to report the health and physical education results, present the graphical formats used throughout the report, and provide some technical background and rationale for some of the statistics used.

### IRT scale construction: Critical Thinking in Health and Physical Education

The scale used in this report have been developed using the Rasch Model. The family of Rasch measurement models are frequently used in studies such as this (PISA 2012<sup>5</sup>, TIMSS 2011<sup>6</sup>). The IRT software package WINSTEPS (Linacre, 2009)<sup>7</sup> was used to develop the health and physical education scale. Some advantages of applying the Rasch Model are:

- both items and students can be located independently on the constructed scale;
- unlike raw test scores, the measurement scale units represent the same amount of change in achievement across the whole scale;
- achievement for Year 4 and Year 8 students can be located on the same measurement scale;
- scales can be described to show what students typically understand and are able to do at different parts of the scale (for example, the scale descriptions in Part 3 and Part 4 of this chapter).

### Standardising the scales

As described, the health and physical education and the attitudinal scales used in this report have been developed using the Rasch model. For ease of understanding, each of the scales has been designed so that:

- the mean of all students (Year 4 and Year 8 combined) is equal to 100 scale units
- the average standard deviation for the two year levels is equal to 20 scale units
- this means that scores on all the scales range from around 20 to 180 scale units.

### Scale reliability

Table 2.4 provides reliability indices for each of the reporting scales developed for use in the assessment programme. These relate to the reliability of students' scale scores and have been calculated by the WINSTEPS software used to construct the scales. The overall reliabilities are satisfactory and indicate that for each measure, student achievement and attitudes to health and physical education have been located on the scale with a satisfactory level of precision.

Table 2.4 The reliability of the NMSSA measures

Measure	Person Reliability
Critical Thinking in Health and PE	0.81
Attitude to Health	0.82
Attitude to PE	0.79

### Reporting achievement against curriculum levels

The NZC provides achievement objectives for each learning area that set out selected learning processes, knowledge and skills relative to eight levels of learning. A curriculum alignment exercise was undertaken to link performance ranges on the NMSSA Critical Thinking in Health and Physical Education achievement scale to Levels 2 to 4 of the NZC. Creating this link allowed scale scores for the measure to be reported in terms of curriculum levels. Some tasks used to assess health and physical education such as those related to understanding of well-being and movement skills were not included in the health and physical education measure because they were distinctly different constructs.

<sup>5</sup> PISA 2012. [http://www.educationcounts.govt.nz/topics/research/pisa\\_research/pisa\\_2012](http://www.educationcounts.govt.nz/topics/research/pisa_research/pisa_2012)

<sup>6</sup> TIMSS 2011. <http://www.educationcounts.govt.nz/topics/research/timss>

<sup>7</sup> Linacre, J. M. (2009). WINSTEPS Rasch measurement computer program. Chicago: Winsteps.com

A panel of health and physical education learning area experts took part in a curriculum alignment study to establish the NMSSA scale score levels for 'minimally competent' Level 2 and Level 4 students. This defined the score ranges on the health and physical education scale associated with curriculum Level 2 or above, and curriculum Level 4 or above for students in Years 4 and 8.

In the NZC each of the first four curriculum levels has been designed to represent about two years of learning at school. In general, students are expected to be achieving at curriculum Level 2 by the end of Year 4 and curriculum Level 4 by the end of Year 8. These benchmarks are used throughout the report to define expected performance bands for each year level.

More information about the curriculum alignment procedures is provided in Appendix 3.

## Use of graphs in the report

### Box and whisker plots

These plots are used extensively throughout this report. They are used to summarise groups of scores. Scores are ordered from low to high and then divided into four equally sized groups, called quartile groups. These are displayed as shown in Figure 2.5.

**Box:** The box shows the middle 50 percent of the scores (between the 25th and 75th percentiles).

**Whiskers:** In this report, the whiskers of the box plot do not include outliers (scores that are rare and unusual) and have a maximum length of  $1.5 \times$  the inter-quartile range. The box plots in this report do not display outliers.

**Colours used:** Box plots for reporting scales use two colours for the middle quartile groups to make it easier to distinguish between them. If printed in grey scale these colours still produce a contrast.

Box plots relating to attitudes to health and physical education are presented in a different pair of colours to distinguish them from those relating to achievement.

**Grid lines:** Grid lines are used on the box plots to make them easier to interpret. These are especially helpful in the graphs with many box plots side by side. The grid lines on the left of the graph are placed at every 40 scale score units.

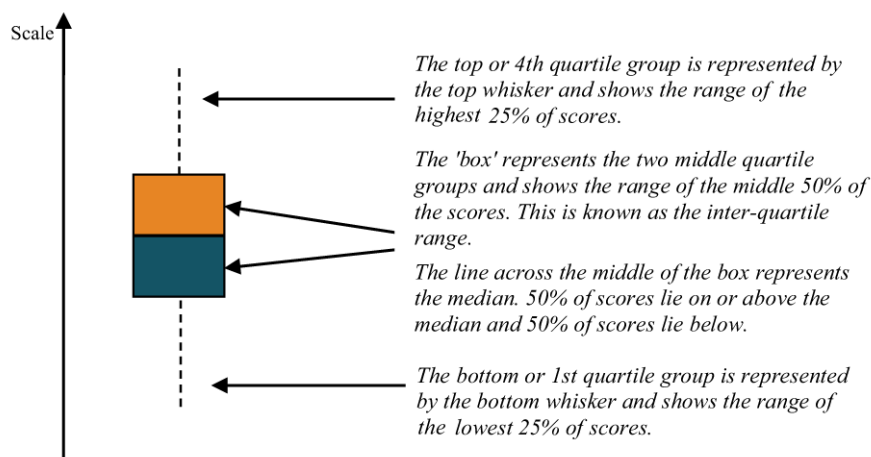


Figure 2.2 Understanding box plots

The NZ curriculum levels that correspond to scale score cut-offs are noted on the right of the graph and are indicated by the grey horizontal dotted lines across the graph (Figure 2.3).

### Line graph of score distributions

Another type of graph used to display data in this report is the line graph (Figure 2.4). These are used to show how the distributions of scores for various groups compare with curriculum expectations.

Horizontal shaded bars are placed on the line graphs to show how the scale aligns to the health and physical education learning area levels. These bars reflect the fact that the curriculum levels themselves and the alignment exercise cannot provide precise cutpoints. Their use as an approximate guide is more appropriate. A detailed exercise was undertaken to establish the locations on the scales where one curriculum level merged into the next. Full details of this can be found in Appendix 3. Curriculum levels are always labelled clearly when used, and should not be confused with grid lines in the box plots.

In graphs that display a scale, the scale is always placed on the vertical axis.

### Graphs of sub-group differences

A graph called the display of scale score differences has been developed to show the differences in scale score units between population sub-groups presented in pairs. An example of this display is shown in Figure 2.5. The display shown provides comparisons for three pairs of Year 4 sub-groups on a fictional NMSSA scale: NZ European compared to non-NZ European, Māori compared to non-Māori, and Pasifika compared to non-Pasifika. A blue bar is presented for each pair. The top of each bar marks the average score for the sub-group in each pair that scored higher overall.

The bottom of the bar marks the average score for the sub-group in the pair that scored lower. The number above the bar indicates the difference between the two average scores in scale score units. The dotted red line shows the national average score for all students in Year 4.

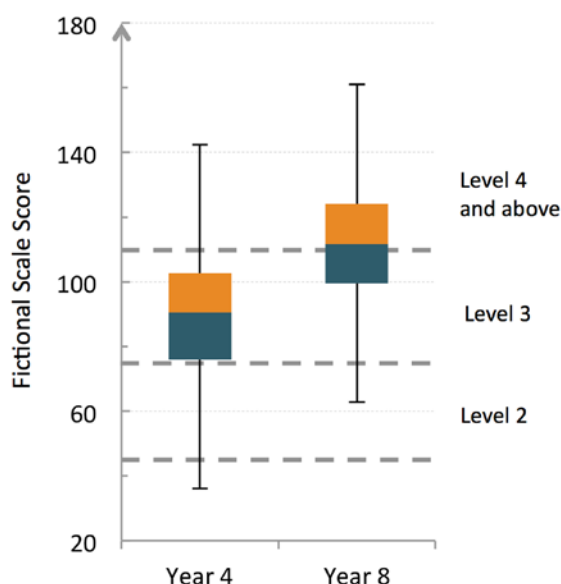


Figure 2.3 Interpreting box plots and NZC level bands

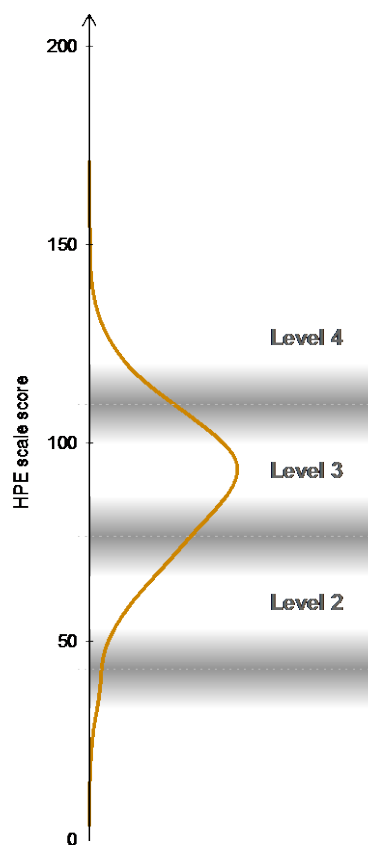


Figure 2.4 An example of a line graph display

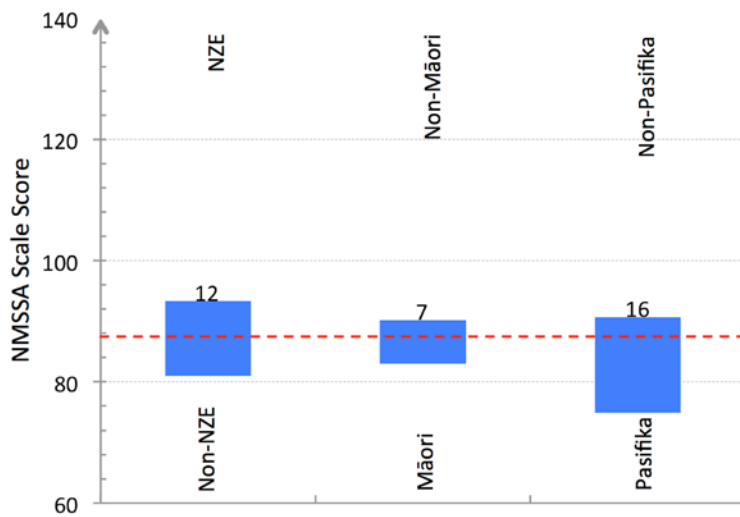


Figure 2.5 The display of Year 4 sub-group differences on a fictional NMSSA scale

### Interpreting score differences, effect size statistics and statistical significance

The achievement measure developed for the NMSSA health and physical education study quantifies difference in terms of scale score units. Because the same scales have been used at both Year 4 and Year 8 it is possible to estimate how much change on average occurs on an annual basis. Table 2.5 shows the differences in average scale scores on the health and physical education scale between Year 4 and Year 8, and how this relates to annualised change. As can be seen, students improved on average by about six scale units per year. This figure is useful to keep in mind when interpreting scale score differences throughout the report.

Table 2.5 Average scale score difference between Year 4 and Year 8 on Critical Thinking in Health and PE

	Critical Thinking in Health and PE
Year 4/Year 8 difference* (scale score units)	23
Average annual difference (scale score units)	6
Effect size	1.14
Average annual effect size	0.28

\* Difference = Year 8 - Year 4

Table 2.5 also shows what the scale score differences between Year 4 and Year 8 equate to in terms of effect sizes. As can be seen the average annual effect size is 0.28. Effect sizes have been used throughout the report to help interpret differences between groups. An effect size quantifies the difference between the average scores for two groups in terms of standard deviation units. The calculation of the effect sizes in this report weights the standard deviation for each group by its sample size<sup>8</sup>. Because the standard deviations for groups are often different, this can mean that the same difference in scale scores results in slightly different effect sizes for different pairs of groups. When comparing two effect sizes it is important to refer back to the scale score differences.

<sup>8</sup> The formula for the effect size calculation is:  $\frac{M_1 - M_2}{\sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}}$ , where  $M_1$  and  $M_2$  represent the average scores for group 1 and group 2,  $s_1$  and  $s_2$  their standard deviations, and  $n_1$  and  $n_2$  the number in each group.



Ninety-five percent confidence intervals have been calculated for each effect size reported and used to determine when an effect is statistically significant. When an effect is statistically significant it means that the data support the hypothesis that the effect size is real (non zero). Statistically significant effect sizes are shown in bold text in the tables of findings. The confidence intervals have been adjusted to account for any design effect created through the sampling procedure (i.e. sampling schools and then sampling students). As well as considering statistical significance, it is also important to consider the size of the effect. When groups are large (as for NMSSA), relatively small effects can be statistically significant.

Effect sizes have been used to examine:

- the difference in achievement between Year 4 and Year 8 students
- the difference between subgroups of students (girls/boys; NZ European/Non-NZ European, Māori/Non-Māori, Pasifika/Non-Pasifika students; schools of high, mid and low decile; and types of school (at Year 4 - full primary, and contributing; at Year 8 - composite, full primary, intermediate, and secondary).

Differences between the effect sizes for different pairs of comparisons were considered notable (significant) when the confidence intervals (adjusted for design effect) surrounding the respective effect sizes were non-overlapping. The average annual effect size between Year 4 and Year 8 student achievement (0.28) is used as a guideline to interpret sub-group effect sizes in terms of years of progress.

### **The use of rounding**

The average score for each group and sub-group have been rounded to whole numbers. Some tables of findings report the difference between average scale score units for two groups or sub-groups. The scale score differences have been calculated using non-rounded numbers, and are numerically correct. In some cases the scale score *difference* may not be the same as the simple difference in the pair of averages reported in the table.

# 3

## Student Achievement in Health and Physical Education

This chapter describes Year 4 and Year 8 student achievement in health and physical education (PE) based on the measure of health and physical education achievement developed for the NMSSA study: Critical Thinking in Health and Physical Education. It also reports descriptively other important aspects of health and physical education: students' understanding of well-being and movement skills. It examines how achievement varies within and between year levels, including variation by gender, ethnicity, school decile and type of school. Achievement is reported against the levels of the New Zealand Curriculum (NZC).

The chapter is organised into five parts. The first and second parts consider achievement for Year 4 and Year 8 students respectively on the Critical Thinking in Health and Physical Education measure. The third part examines achievement by decile and ethnicity, and the fourth part compares achievement between the two year levels. The fifth part examines aspects of the health and physical education assessment in greater detail. It also provides descriptive reporting on students' understanding of well-being and movement skills.

Tables and graphs are used throughout the chapter to display results. For many of the tables, particularly those associated with population sub-groups, fuller tables of means, standard deviations, sample sizes, effect sizes and 95 percent confidence intervals can be found in Appendix 4.

## Success and achievement of students in health and physical education – An overview

### Achievement against curriculum levels

Students' performance in health and physical education was assessed using the Critical Thinking in Health and Physical Education measure which was aligned to the New Zealand Curriculum (NZC) levels in health and physical education. Almost all Year 4 students scored within curriculum Level 2 or above, and just over half of Year 8 students scored within Level 4 or above. Year 4 students were exceeding the expectations expressed in the NZC. Year 8 students were achieving below curriculum expectations.

### Achievement of sub-groups

There was a wide distribution of scores at both year levels and considerable overlap in the achievement of Year 4 students and Year 8 students. Analysis of population sub-groups showed that on average, achievement varied by ethnicity and school decile, but not by gender or school type. For both year levels average scores on Critical Thinking in Health and Physical Education were lower for Māori and Pasifika students than for non-Māori and non-Pasifika students respectively. Average scores were also lower for students from lower decile schools. These patterns are consistent with those observed in health and physical education in NEMP from 1998, 2002, and 2006, and in science and writing in NMSSA, 2012.

An analysis to examine differences in achievement by decile and ethnicity identified separate effects of both. When decile differences were accounted for, ethnicity differences in achievement on Critical Thinking in Health and Physical Education remained. Differences evident in average scores on Critical Thinking in Health and Physical Education for Māori and Pasifika students and NZ European students were significant. This is similar to findings from NMSSA Mathematics and Statistics (2013) where significant ethnicity differences were also found after school decile was taken into account.

### 'Progress' between Year 4 and Year 8

The difference in average scores between Year 4 and Year 8 was used as a proxy for progress. It was equivalent to an average annual effect size of 0.28, lower than that found for NMSSA Knowledge and Application of Mathematical and Statistical Ideas (0.36) (2013), Writing for a Variety of Measures (0.36), Nature of Science (0.34) and similar for that found for NMSSA Knowledge and Communication of Science ideas (0.30) (2012). The difference between Year 4 and Year 8 average scores was similar for gender, ethnicity, types of school, and school decile.

On a task that assessed student perceptions of well-being, a high proportion of students at both year levels were able to identify the mental/emotional and social dimensions of well-being, followed by the physical dimension. A much smaller proportion identified a spiritual dimension. At both year levels, a larger proportion of girls than boys identified the social dimension.

Students' movement skills, measured in a series of naturalistic game settings and movement sequences developed considerably from Year 4 to Year 8. Gender and decile differences persisted from Year 4 to Year 8, reflecting longstanding differences in these areas. On average, boys scored higher on a range of movement skills and strategic action skills within a game context, while girls scored slightly higher on performing movement sequences. More students from high decile schools than students from mid and low decile schools displayed higher levels of achievement on a range of movement skills and strategic action skills within a game context. This pattern was particularly evident for performing movement sequences.

# 1. Year 4 achievement in critical thinking in health and physical education

## Overall achievement

Table 3.1 provides the average scale score, standard deviation and sample size for Year 4 students on the NMSSA Critical Thinking in Health and Physical Education achievement measure.

Table 3.1 Year 4: Overall measure of achievement on the Critical Thinking in Health and PE scale

	Critical Thinking in Health and PE
Average (scale score units)	89
SD (scale score units)	20
N	776

The average score for Year 4 students on the Critical Thinking in Health and Physical Education measure was 89 scale score units. Drawing on the scale description for this measure<sup>9</sup> this indicates that the Year 4 students clustered around the average (the middle 50 percent) were typically able to:

- share their understandings, ideas, or viewpoints;
- identify factors that impact on well-being generally;
- state practices to support their well-being;
- recognise general health messages;
- suggest general reasons for actions and reactions when people are responding to problems or issues;
- join in and participate in games.

These students were also beginning to:

- identify their own perspective and acknowledge alternative viewpoints;
- identify factors that impact on the well-being of themselves and others;
- explain strategies and actions to promote their well-being;
- recognise general health messages and state ways to inform others about these;
- identify specific reasons for actions and reactions when people are responding to problems/issues;
- identify movements needed to participate in games and identify some strategies they can employ

A curriculum alignment exercise was undertaken for the first time to link performance on the NMSSA Critical Thinking in Health and Physical Education achievement scale to the NZC (See Appendix 3 for details). As the curriculum is described in a very flexible way, and the scale was only designed to cover the critical thinking aspect of the health and physical education curriculum, the alignment procedure could only validly be used to report Year 4 and Year 8 scale scores in terms of Level 2 and Level 4 respectively.<sup>10</sup> Table 3.2 shows that almost all Year 4 students achieved at Level 2 or above exceeding the expected level of performance for Year 4 students.

Table 3.2 Percentage of Year 4 students achieving at the NZC Health and PE level 2 on the Critical Thinking in Health and PE measure

	Critical Thinking in Health and PE (%)
Level 2 and above	97
Not yet Level 2	3

<sup>10</sup> This is the first time that curriculum alignment has been undertaken in NZC health and physical education. The cutoffs described in this report are broad estimates. Refer to Appendix 3 for details of the procedure used.

Figure 3.1 shows the distributions of students' scores across the curriculum levels. The grey bars mark the threshold areas of the different levels. They have been made wide to reflect the imprecision in the exercise of aligning assessment results to the curriculum levels.

### Year 4 achievement by sub-group

Figure 3.2 displays the level and spread of scores for population sub-groups in Year 4 on the Critical Thinking in Health and Physical Education measure. Box plots are used to show results by gender, ethnicity<sup>11</sup>, school decile<sup>12</sup> and type of school.<sup>13</sup> Table 3.3 sets out the average score, standard deviation, and number of students in each sub-group.

At Year 4 there were statistically significant differences between the average scores of the ethnicity and decile sub-groups. On average, NZ European students scored higher than Asian students and both of these groups scored higher than Māori and Pasifika students. High decile school students scored higher on average than students from mid decile schools. These students in turn scored higher than students from low decile schools.

Gender and school type differences were not statistically significant.

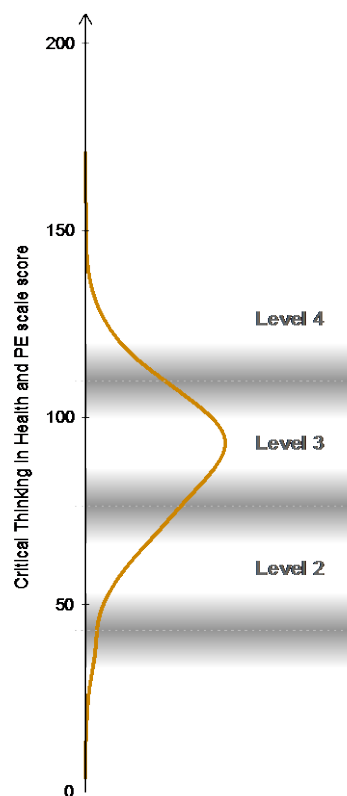


Figure 3.1 Distribution of Year 4 student achievement on Critical Thinking in Health and PE against NZC health and PE

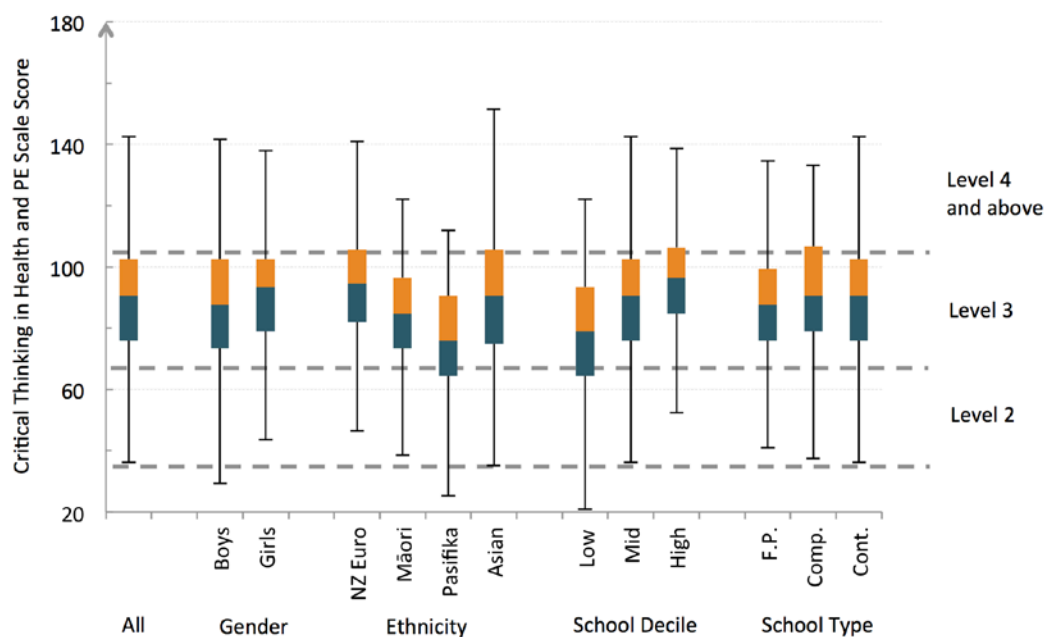


Figure 3.2 Year 4 student achievement on Critical Thinking in Health and PE by gender, ethnicity, school decile and school type (NZ Euro=NZ European, F.P.=Full Primary, Comp.=Composite, Cont.=Contributing)

<sup>11</sup> Non-prioritised ethnicity was used where students could identify with up to three ethnicities. This meant they could be present in multiple ethnic groups. Student ethnicity data were obtained from student NSN information held on the Ministry of Education ENROL database. The 'NZ European' category included NZ Pākehā only. The 'Pasifika' category included Tokelauan, Fijian, Niuean, Tongan, Cook Islands Māori, Samoan and other Pacific peoples. The 'Asian' category included Filipino, Cambodian, Vietnamese, Other Southeast Asian, Indian, Chinese, Sri Lankan, Japanese, Korean, and other Asians. The 'Other' category included Australians, British/Irish, German, Dutch, Greek, Polish, South Slav, Italian and other Europeans. Middle Eastern, Latin American, African, and Not Stated.

<sup>12</sup> Low decile schools (1-3); Mid decile schools (4-7); High decile schools (8-10) (<http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/SchoolOperations/Resourcing/OperationalFunding/Deciles.aspx>)

<sup>13</sup> 4 Full Primary (Year 1-8); Contributing (Year 1-6); Intermediate (Year 7-8); Composite (Year 1-13); Secondary (Year 7-13)

Table 3.3 Year 4 student achievement on Critical Thinking in Health and PE by gender, ethnicity, school decile and school type

	Critical Thinking in Health and PE		
	Average (scale score units)	SD (scale score units)	N
<b>Gender</b>			
Boys	87	21	414
Girls	90	19	362
<b>Ethnicity</b>			
NZ European	93	18	483
Māori	83	20	162
Pasifika	75	19	98
Asian	89	22	93
<b>School Decile</b>			
Low	77	21	185
Mid	89	19	275
High	95	18	316
<b>School Type</b>			
Full Primary	87	20	298
Composite	91	21	23
Contributing	90	20	455

Figure 3.3 displays the differences in average scale scores between the sub-groups, illustrating their relative differences on the measure of Critical Thinking in Health and Physical Education. Table 3.4 summarises average scale score differences and their effect sizes between sub-groups on this scale.

At Year 4 there was an 18 scale score unit difference (ssud) between the average score of students attending high decile schools and the average score of students from low decile school, by about three years' achievement (an effect size of -0.92). Using the average annual effect between Year 4 and Year 8 as a guideline (see Table 3.9), this difference was equivalent to about three years of achievement). The difference between low and mid decile groups was still considerable with an effect size of -0.60 (12 ssud) and equivalent to about two years' achievement, while the difference between mid and high decile groups was smaller with an effect size of -0.30 (6 ssud) and equivalent to about one year of achievement. These effect sizes were all statistically significant.

NZ European students achieved higher scores on average than non-NZ European students by 12 ssud (effect size 0.64); non-Māori students achieved higher scores on average than Māori students by 7 ssud (effect size of -0.35) and Non-Pasifika students achieved higher scores on average than Pasifika students by 16 ssud (effect size of -0.80). Again the differences are equivalent to between one and two years' difference in achievement for the different comparisons.

It is important to note that differences between ethnic groups may be confounded with decile differences and with the non-Māori group including Pasifika students who scored lower than Māori. This issue is discussed further in Chapters 5 and 6.

The findings indicate that the disparities between the school decile and ethnicity sub-groups are similar to those found in NEMP in 1998, 2002, and 2006. The lack of gender difference or differences by school type is also in keeping with the NEMP findings.

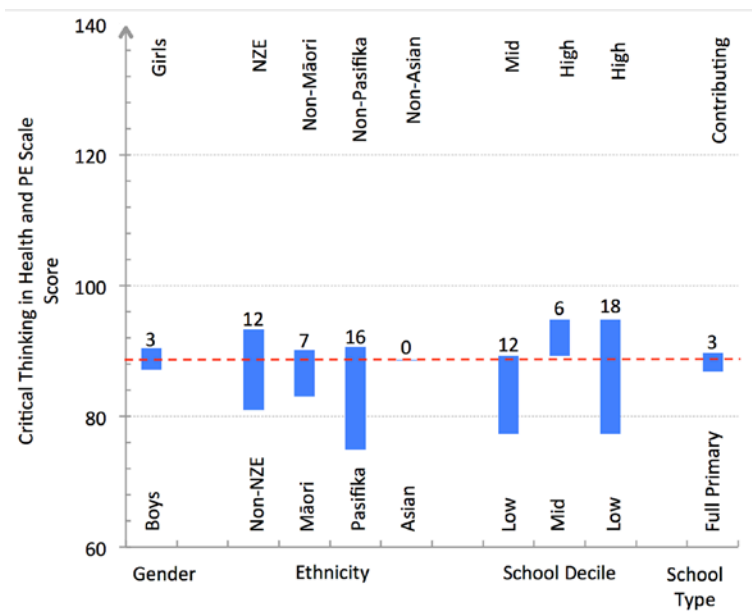


Figure 3.3 Year 4 students: Difference in average scores for Critical Thinking in Health and PE by sub-group (NZE=NZ European; red dotted line is the Year 4 national average scale score)

Table 3.4 Year 4 sub-group differences on Critical Thinking in Health and PE

	Critical Thinking in Health and PE	
	Difference (scale score units)	Effect Size
<b>Gender</b>		
Boys/Girls	-3	-0.16
<b>Ethnicity</b>		
NZ European/Non-NZ European	12	0.64
Māori/Non-Māori	-7	-0.35
Pasifika/Non-Pasifika	-16	-0.80
Asian/Non-Asian	0	0.00
<b>School Decile</b>		
Low/Mid	-12	-0.60
Mid/High	-6	-0.30
Low/High	-18	-0.92
<b>School Type</b>		
Full Primary/Contributing	-3	-0.14

Effect sizes in bold are statistically significant ( $p < .05$ ). The scale score differences have been calculated using non-rounded numbers, and are numerically correct. In some cases the scale score difference may not be the same as the simple difference in the pair of averages reported in another table.

## 2. Year 8 achievement in Critical Thinking in Health and Physical Education

### Overall achievement

Table 3.5 provides the average scale score, standard deviation and sample size for Year 8 students on the NMSSA Critical Thinking in Health and Physical Education achievement measure.

Table 3.5 Year 8: Overall measure of achievement on the Critical Thinking in Health and PE scale

	Critical Thinking in Health and PE
Average (scale score units)	111
SD (scale score units)	20
N	762

The average score for Year 8 students on the Critical Thinking in Health and Physical Education measure was 111 scale score units. The middle 50 percent of Year 8 students demonstrated higher levels of the competencies described for Year 4 students. They were typically able to:

- identify their own perspective and were in the initial stages of being able to acknowledge alternative viewpoints;
- identify factors that impact on the well-being of themselves and others;
- explain strategies and actions to promote their well-being;
- recognise general health messages and state ways to inform others about these;
- identify specific reasons for actions and reactions when people are responding to problems/issues;
- identify movements needed to participate in games and identify some strategies they can employ.

Table 3.6 and Figure 3.4 and show the distribution of Year 8 students' scores on the Critical Thinking in Health and Physical Education assessment across the curriculum levels. Student achievement ranged from Level 2 through to Level 4 or above. Just over half of the Year 8 students achieved at Level 4 with the remainder performing at Level 3 or below. Year 8 students were therefore achieving below the expected curriculum level in health and physical education.

Table 3.6 Percentage of Year 8 students achieving at the NZC health and PE level 4 on to the Critical Thinking in Health and PE measure

	Critical Thinking in Health and PE (%)
Level 4 and above	51
Not yet Level 4	49

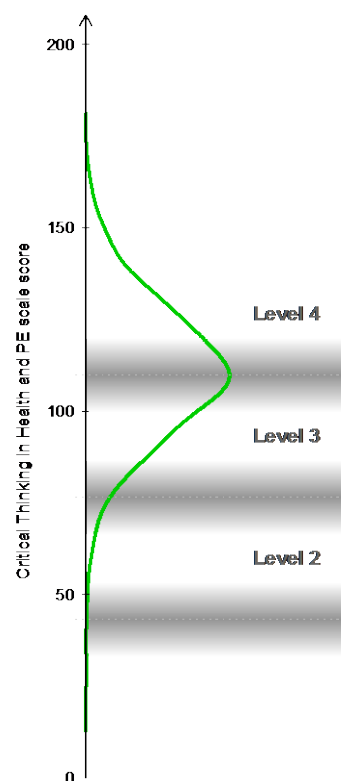


Figure 3.4 Distribution of Year 8 student achievement on Critical Thinking in Health and PE against NZC health and PE levels



## Year 8 achievement by sub-group

Figure 3.5 displays the achievement results for the sub-groups in Year 8 on the Critical Thinking in Health and Physical Education measure. Box plots show results by gender, ethnicity, school decile and school type. Table 3.7 sets out, the average score, standard deviation, and number of students in each sub-group.

The pattern of achievement across the sub-groups at Year 8 was similar to that at Year 4. NZ European students scored higher on average than Asian and Māori students who scored higher on average than Pasifika students. Students attending low decile schools scored lower on average than those from mid- or high decile schools. Gender and school types differences were not significant.

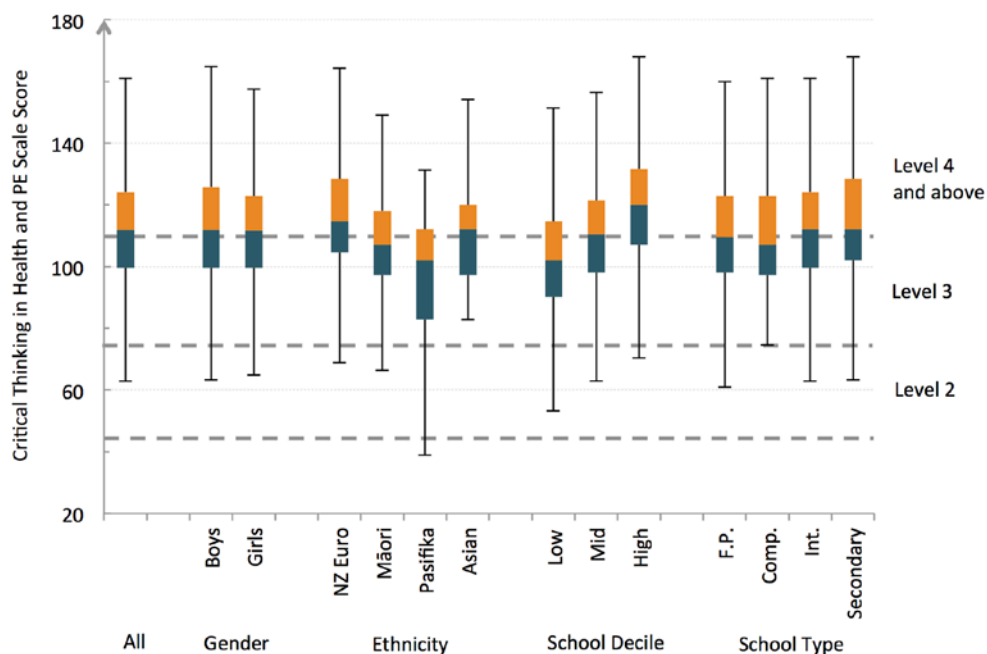


Figure 3.5 Year 8 student achievement in Critical Thinking in Health and PE by gender, ethnicity, school decile and school type (NZ Euro=NZ European, F.P.=Full Primary, Comp.=Composite, Int.=Intermediate)

Table 3.7 Year 8 student achievement on Critical Thinking in Health and PE by gender, ethnicity, school decile and school type sub-groups

	Critical Thinking in Health and PE		
	Average (scale score units)	SD (scale score units)	N
<b>Gender</b>			
Boys	112	19	378
Girls	111	21	384
<b>Ethnicity</b>			
NZ European	116	19	455
Māori	108	17	188
Pasifika	97	21	101
Asian	111	17	61
<b>School Decile</b>			
Low	101	20	163
Mid	111	18	361
High	120	19	238
<b>School Type</b>			
Full Primary	110	20	291
Composite	107	18	39
Intermediate	112	20	331
Secondary	114	18	101

Figure 3.6 displays the differences in average scale scores between the sub-groups, illustrating their relative differences on the Critical Thinking in Health and Physical Education measure. Table 3.8 summarises the sub-group information, showing differences in average scale scores between sub-groups and their effect sizes, on this scale.

The pattern of results for the different sub-groups at Year 8 was the same as that for the corresponding groups at Year 4, with statistically significant differences (in average scores) between ethnicity and decile groups, but not for gender or school type. The difference between Pasifika and non-Pasifika was the largest difference across the ethnic groups (17 scale score units) with an effect size of 0.90. Using the average annual effect between Year 4 and Year 8 as a guideline (see Table 3.9). This difference is equivalent to about three years' achievement. The differences between NZ European and non-NZ European was a little less (12 scale score units) with an effect size of 0.63 equivalent to about two years' achievement. The difference between Māori and non-Māori was modest (5 scale score units) with an effect size of 0.25 equivalent to about one year's achievement. There was no difference in the average achievement score between Asian and non-Asian students at either Year 4 or Year 8.

The effect sizes for to the differences in average scores between Year 8 low, mid and high decile school students ranged from -0.49 to -0.95, with the largest difference being between low and high decile schools (18 scale score units). This difference was equivalent to approximately three years of achievement.

It is important to note that differences between ethnic groups may be confounded with decile differences and with the non-Māori group including Pasifika students who scored lower than Māori. This issue is discussed further in Chapters 5 and 6.

There were no significant differences in achievement on the Critical Thinking in Health and Physical Education scale by school type for Year 8 students.

The findings at Year 8 indicate that the disparities between the school decile and ethnicity sub-groups are similar to those found in NEMP in 1998, 2002, and 2006. The lack of gender difference or differences by school type is also in keeping with the NEMP findings.

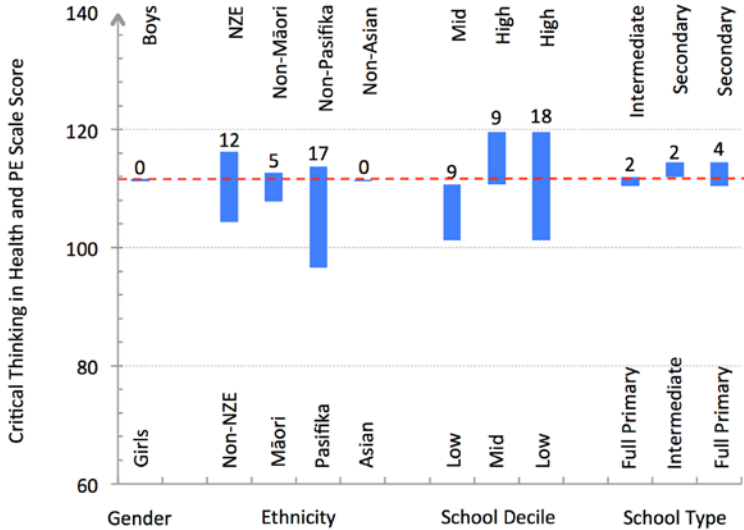


Figure 3.6 Year 8 students: Difference in average scores for Critical Thinking in Health and PE by sub-group (NZE=NZ European)

Table 3.8 Year 8 sub-group differences on the Critical Thinking in Health and PE scale

	Critical Thinking in Health and PE	
	Difference (scale score units)	Effect size
<b>Gender</b>		
Boys/Girls	0	0.02
<b>Ethnicity</b>		
NZ European/Non-NZ European	12	0.63
Māori/Non-Māori	-5	-0.25
Pasifika/Non-Pasifika	-17	-0.90
Asian/Non-Asian	0	0.01
<b>School Decile</b>		
Low/Mid	-9	-0.50
Mid/High	-9	-0.49
Low/High	-18	-0.95
<b>School Type</b>		
Full Primary/Intermediate	-2	0.08
Intermediate/Secondary	-2	-0.12
Full Primary/Secondary	-4	-0.21

Effect sizes in bold are statistically significant ( $p < .05$ ). The scale score differences have been calculated using non-rounded numbers, and are numerically correct. In some cases the scale score difference may not be the same as the simple difference in the pair of averages reported in another table.

### 3. Achievement by decile and ethnicity

The previous sections have highlighted that school decile and student ethnicity are both important factors associated with health and physical education achievement. It is important to note that any differences in average scores between ethnic groups may be confounded with decile differences. A regression analysis identified separate effects for decile and ethnicity. In other words when we accounted for decile differences, there are still differences in achievement in average scores in Critical Thinking in Health and Physical Education average scores between NZ European, Māori and Pasifika students. Further details of this analysis can be found in the chapters about Māori and Pasifika student achievement and in Appendix 5.

## 4. Comparison of Year 4 and Year 8 achievement

The use of reporting scales common to both Year 4 and Year 8 makes it possible to compare achievement between the two year levels. Figure 3.7 shows the distribution of Year 4 and Year 8 students on the Critical Thinking in Health and Physical Education scale.

As expected, Year 8 students achieved higher scores on average than Year 4 students. However, there was a wide distribution of scores at both year levels and considerable overlap in the achievement of Year 4 students and Year 8 students.

Table 3.9 shows the average scores and their standard deviations on the Health and Physical Education measure along with the difference in average scores between Year 4 and Year 8 students expressed in scale score units and as an effect size for the four-year difference and the average effect size per year. The difference between the average score for Year 4 and Year 8 students was 23 scale units. This represents an effect size of 1.14 and an average annual effect size of 0.28.

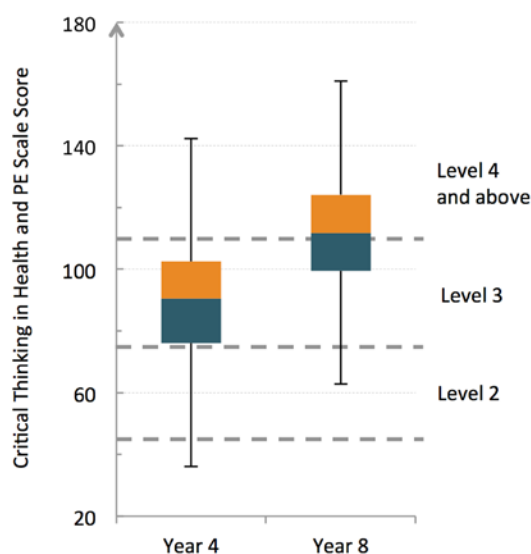


Figure 3.7 Year 4 and Year 8 student achievement on Critical Thinking in Health and PE by year level

Table 3.9 Overall measure of achievement in Critical Thinking in Health and PE and difference of achievement by year level

	Critical Thinking in Health and PE	
	Year 4	Year 8
Average (scale score units)	89	111
SD (scale score units)	20	20
N	776	762
Year 4/Year 8 difference*	23	
Effect size	<b>1.14</b>	
Annual average effect size	0.28	

\* Difference = Year 8 - Year 4.

Effect sizes in bold are statistically significant ( $p < .05$ )

The scale score differences have been calculated using non-rounded numbers, and are numerically correct. In some cases the scale score difference may not be the same as the simple difference in the pair of averages reported in the table.

### Sub-group achievement between Year 4 and Year 8

Table 3.10 displays for gender, decile and ethnic sub-groups, the Year 4 and Year 8 average scores on Critical Thinking in Health and Physical Education, the differences between them in scale score units, and the effect sizes related to the differences.

The table details the difference in average scores between one cohort of students at Year 4 and another at Year 8. We use this difference to provide an estimate of progress between these year levels. Noted however that this is not a measure of actual progress by a particular group of students.

The difference in average scores between Year 4 and Year 8 fell between 21 and 25 scale score units across all comparisons. These differences are expressed as average annual effect sizes ranging from 0.26 to 0.34. The sub-groups showing slightly greater levels of growth were Māori students and students in high decile schools.

Table 3.10 Differences on the Critical Thinking in Health and PE measure between Year 4 and Year 8 students by sub-group

	Critical Thinking in Health and PE				
	Year 4 Average (scale score units)	Year 8 Average (scale score units)	Difference* (scale score units)	Effect Size	Average Annual Effect Size
<b>Gender</b>					
Boys	87	112	25	<b>1.23</b>	0.31
Girls	90	111	21	<b>1.04</b>	0.26
<b>Ethnicity</b>					
NZ European	93	116	23	<b>1.25</b>	0.31
Māori	83	108	25	<b>1.35</b>	0.34
Pasifika	75	97	22	<b>1.08</b>	0.27
Asian	89	111	23	<b>1.12</b>	0.28
<b>School Decile</b>					
Low	77	101	24	<b>1.16</b>	0.29
Mid	89	111	21	<b>1.16</b>	0.29
High	95	120	25	<b>1.37</b>	0.34

Difference = Year 8 – Year 4.

Effect sizes in bold are statistically significant ( $p < .05$ )

The scale score differences have been calculated using non-rounded numbers, and are numerically correct. In some cases the scale score difference may not be the same as the simple difference in the pair of averages reported in the table.

## 5. Exploring achievement in health and physical education

In this section we report details of students' performance on two tasks from the Critical Thinking in Health and Physical Education measure. We have chosen a task that students were particularly successful on ('Water Safety') and one that students found very challenging ('Fair Play'). In addition, we report descriptively the achievement of students on two important aspects of health and physical education not captured within the Critical Thinking in Health and Physical Education measure. These were students' understanding of well-being, and movement skills. Because of rounding the percentage frequencies reported in tables in this section may not always sum to 100 percent.

### Performance on two tasks from the Critical Thinking in Health and Physical Education measure

Student achievement on Critical Thinking in Health and Physical Education was assessed across a number of tasks that have been outlined in Chapter 2. These tasks ranged in difficulty. One of the tasks that students had a higher level of success with was a task that focused on water safety where most students were able to identify risks and dangers around water and discuss what they and others can do to keep themselves safe. In contrast, a task that asked students to consider issues of cheating and fair play was more challenging for them.

#### Water Safety task

The Water Safety task examined students' abilities to identify risk and use safe practices in a recreational water context. Students were shown photographs of a range of different water contexts and asked to choose one that was familiar to them. They were then asked a number of questions about keeping safe and identifying and managing hazards or risks. They answered in relation to the context they had chosen. The task is presented in Figure 3.8.

## Water Safety

Look at the pictures of different water places. These places can be good for swimming, water sports, fishing or just being there with family and friends.

Choose **one** water place that you use or visit.

1. Tell me **2** important things you do to keep yourself safe in and around the *(student response* i.e. beach, swimming pool, river, lake).

Sometimes the *(student response)* can be unsafe.

2. What are **2** risks or dangers that you think people who use the *(student response)* should know about so that they can keep themselves safe?

PROMPT The risks or dangers might be caused by people, clothing, equipment or the environment.

If student is unable to answer q2 say (making link with *(student response)* in chosen place):

*Some people think a danger at the beach is being pulled out too deep.*

OR

*Some people think a danger at the swimming pool is slipping over on the wet floor.*

OR

*Some people think a danger at the lake is being out in deep water.*

OR

*Some people think a danger at the river is jumping in where it is too shallow.*

3. What is dangerous or risky with *(student response)*? *(ask q3 for each response to q2)*
4. What can people do to try and not have this happen? *(repeat q4 for each response in q2)*
5. How can people who use the *(student response)* look after it so everyone can enjoy it?

Figure 3.8 Water Safety task instructions

The percentages of Year 4 and Year 8 students responding to each question by criterion on ‘Water Safety’ are summarised in Tables 3.11 to 3.13

- Q1. Tell me 2 important things you do to keep yourself safe in and around the (student’s choice of water setting).

Table 3.11 Percentages of Year 4 and Year 8 students responding to each question by criterion on ‘Water Safety’

	Year 4 (%)	Year 8 (%)
Can identify two different things they do to be safe in and around water	78	88
Can identify one thing they do to be safe in and around water	21	12
No response/unsure/don’t know/other answer	1	0

- Q2. What are 2 risks or dangers that you think people who use the (student’s choice of water setting) should know about so they can keep themselves safe?

- Q3. What is risky or dangerous with (student’s choice of water setting)?

Table 3.12 Percentages of Year 4 and Year 8 students responding to each question by criterion on ‘Water Safety’

	Year 4 (%)	Year 8 (%)
Two dangers/risks mentioned. Can explain well why each danger/risk is dangerous	42	67
Can identify dangers/risks in aquatic environment with basic description OR one danger/risk described. Must have obvious link to specific environment.	39	28
Can identify one or more dangers/risks in aquatic environment but no description OR basic response	17	5
No response/unsure/don’t know/inappropriate response	2	0

Q4. What can people do to try and not have this happen?

Table 3.13 Percentages of Year 4 and Year 8 students responding to each question by criterion on ‘Water Safety’

	Year 4 (%)	Year 8 (%)
Can develop at least one specific strategy for coping with dangers/risks in aquatic environments. Very clear link to environment and/or dangers/danger identified.	60	80
Can develop strategies for coping with dangers/risks in aquatic environments. General comment.	35	18
No response/unsure/don't know/other answer not linked	5	2

Overall, students at both year levels experienced a high degree of success on this task with a greater percentage of Year 8 students responding more fully than Year 4. At both year levels almost all students successfully identified one or two things they could do to keep themselves safe in and around water (99 percent and 100 percent for Year 4 and Year 8 respectively). Year 8 students scored noticeably higher than Year 4 on their ability to identify two dangers/risks and explain why they posed a risk to people (42 percent compared to 67 percent). Almost all students (95 percent of Year 4 compared to 98 percent of Year 8) were able to identify how people can manage identified dangers/risks.

### Fair Play task

The Fair Play task explored the construct of ‘challenges and social and cultural factors’. It examined how competition can affect people’s behaviour and the impact that competition can have on the quality of their experiences. The scene for this task was set by reminding students that sometimes we see things that are not right or fair when we are playing games or sports. Students were then asked a series of questions about why people might behave unfairly and whether or not cheating is acceptable.

They were also asked if they believed winning was important and if so, why they believed that. Year 8 students were shown photographs of New Zealand Olympic athlete, Valerie Adams. The challenges she encountered at the London Olympics due to another athlete’s cheating were described. They were then asked what was unfair in this scenario and how it might have affected Valerie Adams. Figure 3.9 sets out the instructions for this task.

The percentages of Year 4 and Year 8 students responding to each question by criterion on ‘Fair Play’ are summarised in Tables 3.14 to 3.19.

## Fair Play

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Sometimes when we are playing games and sports we see or experience things that are not right or not fair.

1. Why might people do things that are not right or not fair in games and sports?
2. Is it ok to cheat?
3. Why do you say that?
4. What are some things you can do to make things fair in games and sports?
5. Why would you do that? *(repeat q5 for each thing mentioned in q4)*
6. Is winning important?
7. Why do you say that?

**For Year 8 students only.**

Here are 2 photos of Valerie Adams. Valerie represented New Zealand at the Olympic Games in the shot put event. At the Olympic Games she won the silver medal. It was later found out that the person who won the gold medal had cheated by taking drugs to make her perform better. Valerie was awarded the gold medal some months after the Olympic Games was finished.

8. What were the things that were not fair for Valerie?
9. How might these things affect Valerie?

Figure 3.9 Fair Play task questions

Q1. Why might people do things that are not right or not fair in games and sports?

Table 3.14 Percentages of Year 4 and Year 8 students responding to question by criterion on ‘Fair Play’

	Year 4 (%)	Year 8 (%)
Response indicates more in-depth understanding of issue	11	24
Limited response e.g. because they want to win; the other team cheats	73	73
No response/unsure/don't know	16	2

- Q2. Is it okay to cheat?  
 Q3. Why do you say that?

Table 3.15 Percentages of Year 4 and Year 8 students responding to questions by criterion on 'Fair Play'

	Year 4 (%)	Year 8 (%)
High quality response, full understanding of the issue and able to see various perspectives/sides	0	2
Acknowledges outside influence or personal integrity	18	31
Basic response e.g. No ... because it breaks the rules	78	67
No response/unsure/don't know	5	1

- Q4. What are some things you can do to make things fair in games and sports?  
 Q5. Why would you do that?

Table 3.16 Percentages of Year 4 and Year 8 students responding to questions by criterion on 'Fair Play'

	Year 4 (%)	Year 8 (%)
Responses focus on general/community wide aspects	29	54
Responses focus on the individual	64	45
No response/unsure/don't know	7	1

- Q6. Is winning important?  
 Q7. Why do you say that?

Table 3.17 Percentages of Year 4 and Year 8 students responding to questions by criterion on 'Fair Play'

	Year 4 (%)	Year 8 (%)
High quality response, full understanding of the issue and able to see various perspectives/sides	0	3
Can see both sides and justifies OR In-depth justified response	15	38
Basic response e.g. it is just a game	79	58
No response/unsure/don't know	6	2

The following two questions were asked of Year 8 students only.

- Q8. What were the things that were not fair for Valerie?

Table 3.18 Percentages of Year 8 students responding to question by criterion on 'Fair Play'

	Year 4 (%)	Year 8 (%)
Acknowledges the bigger issues. Full understanding of the issue and able to see various perspectives/sides	-	43
Limited response e.g. someone cheated	-	55
No response/unsure/don't know	-	2

- Q9. How might these things affect Valerie?

Table 3.19 Percentage of Year 8 students responding to question by criterion on 'Fair Play'

	Year 4 (%)	Year 8 (%)
Acknowledges more complex effects	-	37
Response gives some emotions	-	53
No response/unsure/don't know OR describes the scenario	-	10



Students at both year levels were able to discuss practical and experience-focused reasons for why people might do things that are not right or not fair in games and sports (84 percent and 97 percent at Year 4 and Year 8, respectively). However, far fewer students were able to give a reasoned response on whether or not it was okay to cheat or be unfair (18 percent and 33 percent at Year 4 and Year 8 respectively). When students were asked to identify what they could do to make things fair in games and sports about two thirds of Year 4 students focused on issues at the individual level, while just over half of Year 8 students focused on general or community-wide aspects. Only 15 percent of Year 4 students and 41 percent of Year 8 students were able to provide good explanations to justify their response to the question about whether or not winning was important.

The majority of Year 8 students were able to describe in what ways the London Olympic Games were not fair for Valerie Adams: 43 percent demonstrated a good understanding of the issues. A slightly lower proportion of students (37 percent) were able to provide a strong explanation of how the unfair experience might affect Valerie Adams.

### Well-being task

The NZC identifies the concept of Hauora as being at the heart of learning in Health and Physical Education. Hauora is defined as a Māori philosophy of well-being that includes four dimensions of well-being: spiritual (taha wairua), mental/emotional (taha hinengaro), social (taha whānau) and physical (taha tinana). Because students learn about well-being in a range of different contexts at school, it was not possible to create a well-being task for inclusion in the scale that would be equally accessible and relevant to all students.

Students' understanding of the dimensions of well-being were explored therefore through a well-being task that aimed to capture the breadth of students' conceptions of well-being, rather than act as a measure of learning achievement. The instructions are set out in Figure 3.10.

## Wellbeing

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<b>Part 1</b>	<p>Some people talk about how important it is to feel well and happy.</p> <p>There are lots of different kinds of things that people do or have in their life that helps them feel well and happy. This is sometimes called our well-being or hauora.</p> <p>On your page draw pictures or write words to show the different kinds of things people can do or have in their life to keep themselves feeling well and happy.</p>
<b>Part 2</b>	<p>On your page you've drawn pictures or written words to show the different kinds of things people can do, or have in their life to feel well and happy.</p> <ol style="list-style-type: none"> <li>1. Tell me about what you've drawn.</li> <li>2. Tell me how (<i>student response</i>) helps to make people feel well and happy. (<i>repeat q2 for each thing mentioned</i>)</li> <li>3. Are there any other things that people can do, or have in their life to feel well and happy?</li> <li>4. How does that help people? (<i>repeat q4 for each thing mentioned in q3</i>)</li> </ol>

Figure 3.10 Well-being task instructions

For the well-being task, firstly, students were told that there are lots of different kinds of things that people do or have in their life that help them feel well or happy and that feeling well and happy is sometimes called well-being or hauora. Students were then asked to draw pictures or write words to show the different kinds of things people can do or have in their life to keep themselves feeling well and happy. Following this, students were interviewed about their pictures or words and asked to explain how the aspects they had identified helped to make people feel well and happy.

Students' responses discussed in the interview were recorded and subsequently categorised to dimensions of well-being using the marking guide shown in Table 3.20. This process ensured that a student's written/drawn response was probed and discussed before being categorised. Markers were able to listen to the student's response and gain a fuller understanding of the rationale for the student's inclusion of this activity. For example, if a student listed 'going for a walk' as a well-being activity and when probed said it was because they walk with a friend and like catching up with that friend, then in that case, the walk would be categorised as primarily representing a 'social' dimension of well-being. The categorisation of responses was therefore as consistent with the Hauora model as was reasonably possible, without asking students to classify their own activities. Due to the range of different contexts in which students learn about well-being, an approach that asked students to classify well-being activities according to one particular model would have disadvantaged some students and was not considered appropriate.

Table 3.20 Marking guide used to categorise student responses to well-being task

Dimension of Well-being	Example Category	Examples from students' responses
<b>Physical</b> These relate to the physical body, its growth and development, ability to move, and ways of caring for the body.	1. Food	Eat healthy food; Drink water; Don't eat lollies
	2. Exercise (formal/informal)	Sport; Playing games; Fitness; Going for a walk; Jogging; Dance
	3. Physical Safety	Sun smart; Water safety; Wear a bike helmet/seat belt; Road safety
	4. Cleanliness /Personal hygiene	Teeth; Body
	5. Preventing Illness	Wash hands; Cover mouth when sneezing; Take medication; Keep warm
	6. Sleep	Get enough sleep
	7. Agencies Related to Physical Well-being	Doctor; Nurse; Dentist
<b>Mental /Emotional</b> These relate to coherent thinking processes, acknowledging thoughts and feelings, and responding constructively to mental/emotional challenges.	8. Leisure Activities	Fresh air/be outside; Computer games; Do art; Watching TV; Music; Gardening; Play with animal; Playing X-box
	9. Personal Safety	Anti-bullying; Computer safety; Social media; Time limit for TV
	10. Mental Activities/ Challenges/Emotions	Learn; Feel good about yourself; Take risks; Be happy; Have dreams/goals/employment; Being proud; Laugh; Love; Stay calm
	11. Relaxation Techniques	Relaxation; Meditation; Rest
	12. Agencies Related to Mental Wellbeing	Counsellor
<b>Social</b> These relate to family relationships, friendships, feelings of belonging, compassion, caring, social support	13. Interacting With Others	Have friends/be a friend; Help others; Care for others/environment; Stick up for others; Join a team; Let people join in; Be kind to others; Sharing problems with others; Spending time with family
<b>Spiritual</b> These relate to values and beliefs that determine the way people live, personal identity, self-awareness	14. Agencies Related to Spiritual Well-being	Attending church; Being thankful; Priest; Knowing where I belong; Praying; Having self-control; Self identity; Keeping rules; Social justice; Being respectful; Values - valuing others; Financial support/giving money

Table 3.21 displays the percentage of all students at Year 4 and Year 8 who identified aspects of well-being within each of the four dimensions of physical, mental/emotional, social and spiritual well-being. The analysis also examined differences in conceptions of well-being between boys and girls at each year level.

Overall, these results show that a high proportion of students at both year levels were able to identify the physical, emotional, and social dimensions of well-being, in contrast to a much smaller proportion who identified a spiritual dimension. Approximately 10 percent more of Year 8 students than Year 4 students identified each dimension of well-being. Students were more aware of the mental/emotional dimension (83 percent compared to 94 percent at Year 4 and Year 8 respectively) and social dimension (72 compared to 86 percent), than the physical dimension (60 percent compared to 70 percent). It should be noted that

because the question included the phrase ‘feel well and happy’ it might have primed students to consider aspects other than the physical. Very few students (5 percent of Year 4 and 15 percent of Year 8) mentioned the spiritual dimension of well-being.

Boys and girls responded similarly on some dimensions but differently on others. At Year 4, both boys and girls identified the mental/emotional aspect of well-being (both 83 percent), physical (59 percent and 62 percent) and spiritual well-being (both 5 percent). The only gender difference of note at Year 4 was that a higher percentage of girls, than boys identified the social dimension (79 percent compared to 66 percent).

At Year 8 boys and girls showed an equally high recognition of the mental/emotional dimension (94 percent). Boys were slightly more likely to identify the physical dimension (72 percent compared to 67 percent) and girls the social dimension (90 percent compared to 82 percent). A higher proportion of girls than boys mentioned the spiritual dimension (18 percent compared to 12 percent).

Table 3.21 Percentage of students identifying each dimension of Well-being by year level and gender

	Year 4			Year 8		
	All (%)	Boys (%)	Girls (%)	All (%)	Boys (%)	Girls (%)
Physical	60	59	62	70	72	67
Mental/Emotional	83	83	83	94	94	94
Social	72	66	79	86	82	90
Spiritual	5	5	5	15	12	18

## Movement skills

The NMSSA assessment of movement skills required students to participate in a number of naturalistic activities where a range of movement skills could be assessed. This approach was selected over an isolated assessment of particular skills such as shooting a ball through a hoop or demonstrating a static seated balance.

The first game, Rippa Tag, involved two students moving within a confined space where the object of the game was to catch an opponent and rip off a tag that was stuck with Velcro to the opponent’s belt. This game allowed an assessment of a range of movement skills including (but not limited to) rotation, agility, and balance, along with strategic action skills.

The second game, Rua Tapawhā (two square) involved students throwing the ball into their opponent’s square in such a way that the opponent would not be able to catch it after one bounce. The trained assessor acted as the opponent, providing a consistent standard of opposition for students. Students were assessed on a range of movement skills including (but not limited to) throwing, catching, defensive tracking and strategic action skills.

The third activity required students to create a movement sequence that included three different movement types using ropes, ribbons, tira, or hacky sacks. Students were told they should be able to repeat the sequence, and were asked to think about rotation, balance, different levels and speeds and moving around. After they performed the sequence, students were asked to create and perform a new movement sequence with another student that modified or adapted their previous sequence and included a new movement. Students were assessed on their control of the equipment, change of pace, level, and use of their bodies, as well as variations in movements, use of equipment, and use of space.

Student performance on each task is presented separately to enable examination of differences across the different movement skill tasks by year level, gender and school decile.

### Rippa Tag

The guide to scoring (Table 3.22) sets out the movement skills demonstrated by students on Rippa Tag for Year 4 and Year 8 students (Table 3.23 and Table 3.24). The results showed students’ movement skills increasing markedly notably from Year 4 to Year 8. Almost two thirds of Year 4 students performed in the low and low to mid ranges; to 40 percent of the Year 8 students performed in these ranges. Just over one third of Year 4 students performed in the mid to high ranges in comparison to 60 percent of Year 8 students.

At both year levels boys showed a higher level of movement skill than girls, with 21 percent of the girls at Year 4 performing in the low range in contrast to 9 percent of the boys, and 27 percent of Year 8 boys performing in the high range at year 8 in contrast to 13 percent of the girls. However, the gender difference between those scoring in the mid-high and high range was much less at Year 8 than Year 4 (a gender difference of 21 percent at Year 4 and 10 percent at Year 8).

At Year 4 students across all decile groups achieved in a similar way with about half of students in each decile achieving in the low to mid range. At Year 8 slightly more students in high decile schools than students in mid and low decile schools achieved in the mid to high range of movement skills.

Table 3.22 Scoring guide for Ripa Tag

Low Range	Mid Range	High Range
<p>Shows:</p> <ul style="list-style-type: none"> <li>• Uses one strategy- does not try something new when one way doesn't work</li> <li>• Heavy on feet, flat on feet</li> <li>• Stumbles forward to grab and when repositioning body after snatch</li> <li>• Unable or slow to change direction effectively</li> <li>• Unbalanced- perhaps feet too far apart/base of support too wide</li> <li>• Tires, gives up</li> <li>• Running not dodging</li> </ul>	<p>Able to competently use:</p> <ul style="list-style-type: none"> <li>• Quick, light feet</li> <li>• Dodge by pushing off outside foot</li> <li>• Defend the space/tag</li> <li>• Balanced so able to transfer weight fluidly</li> <li>• Re-position themselves to gain advantage e.g. moves towards to attack/moves away from opposition</li> <li>• Checking opposition</li> </ul>	<p>Able to competently use:</p> <ul style="list-style-type: none"> <li>• Pivot</li> <li>• Rotate body to snatch and avoid opposition</li> <li>• Lower centre of gravity so able to change direction quickly e.g. crouched position when on attack</li> <li>• On balls of feet - readiness for movement</li> <li>• Quick decision making e.g. change direction or speed, anticipation of opposition moves/tactics</li> <li>• Uses both hands</li> <li>• Consistency over defence/attack</li> <li>• Competitive/shows commitment</li> </ul>

Table 3.23 Year 4 Movement skills: Percentage of students scoring at each level for Ripa Tag activity by year, gender and school decile

	All Year 4	Gender		Decile		
	All (%)	Boys (%)	Girls (%)	Low (%)	Mid (%)	High (%)
Student displays all/almost all aspects from high range movement list	6	9	2	7	6	5
Student displays a variety of aspects – mainly mid range with some high range movements	30	37	23	28	29	33
Student displays a few aspects from mid range with some low range movements	49	45	53	48	52	47
Student displays low range movements	15	9	21	17	13	15

Table 3.24 Year 8 Movement skills: Percentage of students scoring at each level for Ripa Tag activity by year, gender and school decile

	All Year 8	Gender		Decile		
	All (%)	Boys (%)	Girls (%)	Low (%)	Mid (%)	High (%)
Student displays all/almost all aspects from high range movement list	20	27	13	18	18	24
Student displays a variety of aspects – mainly mid range with some high range movements	40	38	42	38	38	45
Student displays a few aspects from mid range with some low range movements	29	26	32	31	29	27
Student displays low range movements	11	10	13	13	15	4

## Rua Tapawhā

Tables 3.25 to 3.27 provide the scoring guide for Year 4 and Year 8 students' performance on the Rua Tapawhā task assessing strategic action skills. As with Ripa Tag, students' skills were considerably more advanced in Year 8 than in Year 4. Fifty-eight percent of Year 4 students performed in the low and low-mid range; the comparable figure at Year 8 was 25 percent. At Year 4, 41 percent of students performed in the mid-high and high ranges whereas at Year 8 the figure was 75 percent.

The gender differences observed in this game were greater at Year 8 than Year 4. Although the gender difference between students performing in the low range was relatively small (5 percent at Year 4 and 4 percent at Year 8), the gender difference between students performing in the high range was larger and increased from Year 4 to Year 8 (3 percent to 20 percent).

At Year 4 students across all decile groups displayed a similar range of movement skills with about half of students in each decile achieving in the low to mid range. At Year 8 slightly more students in high decile schools displayed all/almost all aspects from the high range movement list.

Table 3.25 Scoring guide for 'Rua Tapawhā'

Low Range	Mid Range	High Range
<p>Shows:</p> <ul style="list-style-type: none"> <li>Avoidance reactions: body turns to avoid catch, protecting face with arms, closing eyes</li> <li>Difficulty tracking the ball with the eyes</li> <li>Arms held straight out in front of body</li> <li>The body and arms, rather than the hands, is used to trap the ball</li> <li>Catching is poorly timed and uneven</li> <li>Palms of the hand are face up and catch is more like a scoop</li> <li>Lacks anticipation of where the ball goes</li> <li>Not stepping towards the ball - body movement is passive until point of contact</li> <li>Off-balance</li> <li>Heavy on feet, flat on feet</li> <li>Unable or slow to change direction effectively</li> </ul>	<p>Able to competently show:</p> <ul style="list-style-type: none"> <li>Feet move/body positioned in path/towards ball</li> <li>One foot forward when throwing the ball</li> <li>Eyes follow flight path of the ball</li> <li>Hands reach out to meet the ball</li> <li>Catches and controls ball with hands</li> <li>Wrist and elbows bend then straighten to push the ball</li> <li>Quick on feet</li> <li>Hands ready</li> </ul>	<p>Able to competently show:</p> <ul style="list-style-type: none"> <li>Smooth transference of weight and force - balanced</li> <li>Absorbs impact on catching – elbows and knees bend</li> <li>Body lowered - knees flexed</li> <li>Quick decision making e.g. change in ball direction, anticipation of ball and opposition tactics</li> <li>Defensive tracking</li> <li>Competitive play</li> <li>Centred mid-court position</li> </ul>

Table 3.26 Year 4 Strategic action skills: Percentage of students scoring at each performance level of the Rua Tapawhā activity by year, gender and school decile

	All Year 4		Gender		Decile		
	All (%)	Boys (%)	Girls (%)	Low (%)	Mid (%)	High (%)	
Student displays all/almost all aspects from high range movement list	4	6	3	4	4	5	
Student displays a variety of aspects – mainly mid range with some high range movements	37	42	31	34	35	39	
Student displays a few aspects from mid range with some low range movements	46	42	51	50	49	42	
Student displays low range movements	12	10	15	11	12	14	

Table 3.27 Year 8 Strategic action skills: Percentage of students scoring at each performance level of the Rua Tapawhā activity by year, gender and school decile

	All Year 8	Gender		Decile		
	All (%)	Boys (%)	Girls (%)	Low (%)	Mid (%)	High (%)
Student displays all/almost all aspects from high range movement list	23	33	13	23	20	27
Student displays a variety of aspects – mainly mid range with some high range movements	52	51	53	53	53	50
Student displays a few aspects from mid range with some low range movements	16	9	23	17	17	14
Student displays low range movements	9	7	11	7	10	9

### Movement Sequences

The scoring guide for this task and results of students’ performance across the three aspects of it are set out in Tables 3.28 to 3.30. Students’ aggregated scores for the three aspects of the movement sequences task are reported. Students experienced greater success on this task than either of the other two movement skills tasks. Ninety percent of students at both year levels performed in the mid-high and high ranges.

In contrast to the previous two tasks, gender differences were smaller and occurred in the opposite direction with a greater proportion of girls than boys performing in the high range at both year levels (a difference of 5 percent at both year levels).

At Year 4, more students from mid and high decile schools than students from low decile schools displayed high range of movement sequences skills (24 percent, 43 percent and 46 percent respectively). At Year 8 the differences between students attending low, mid and high decile schools were more marked at the high range level (39 percent, 49 percent and 59 percent, respectively).

Table 3.28 Scoring guide for ‘Movement Sequences’

Movement Sequences
Students were asked to create a movement sequence independently with equipment (ropes, ribbons, tira, or hacky sack. Eight elements were assessed:
<ul style="list-style-type: none"> <li>• Control of equipment</li> <li>• Change of level</li> <li>• Change of pace</li> <li>• Change of use of body parts</li> <li>• Alternate uses of equipment</li> <li>• Leg movement on the spot/body rotation</li> <li>• Variation in size of movement</li> <li>• Use of space</li> </ul>
Students repeated their sequence and were also assessed on:
<ul style="list-style-type: none"> <li>• Ability to repeat the sequence showing consistency with the first display</li> <li>• Movements were controlled/defined and clearly identifiable</li> <li>• Transition between movements in the sequence was smooth</li> </ul>
Students created a new movement sequence in a pair with another student. Students were assessed on:
<ul style="list-style-type: none"> <li>• Evidence of cooperating: each student contributed a movement</li> <li>• Evidence of sharing: both students knew what to do throughout the sequence (even if they showed lack of execution)</li> <li>• Evidence of re-considering the sequence from a new perspective (e.g. variety in level, pace, body parts used, size of movement, use of space, or introduction of a new/different movement).</li> </ul>

Table 3.29 Year 4 Movement sequences skills: Percentage of students scoring at each performance level for the Movement Sequences activity by year, gender and school decile

	All Year 4	Gender		Decile		
	All (%)	Boys (%)	Girls (%)	Low (%)	Mid (%)	High (%)
High range: Includes 4 or more elements, 3 aspects of consistency, and 3 aspects of cooperative work	39	37	42	24	43	46
Mid-high range: Includes 2-3 elements, 2 aspects of consistency, and 2 aspects of cooperative work	51	50	51	59	48	47
Low-mid range: Includes at least 3 movements/ 1 element, 1 aspect of consistency, and 1 aspect of cooperative work	9	11	7	15	8	7
Low range: No response/don't know, does not complete 3 movements, no evidence of consistency, and no evidence of cooperative work	1	1	0	2	1	0

Table 3.30 Year 8 Movement sequences skills: Percentage of students scoring at each performance level for the Movement Sequences activity by year, gender and school decile

	All Year 8	Gender		Decile		
	All (%)	Boys (%)	Girls (%)	Low (%)	Mid (%)	High (%)
High range: Includes 4 or more elements, 3 aspects of consistency, and 3 aspects of cooperative work	50	47	52	39	49	59
Mid-high range: Includes 2-3 elements, 2 aspects of consistency, and 2 aspects of cooperative work	43	46	41	51	45	36
Low-mid range: Includes at least 3 movements/ 1 element, 1 aspect of consistency, and 1 aspect of cooperative work	6	6	6	10	6	5
Low range: No response/don't know, does not complete 3 movements, no evidence of consistency, and no evidence of cooperative work	1	1	1	0	1	0

Overall, performance on the movement skills tasks demonstrated that students' skills developed considerably from Year 4 to Year 8. The gender difference on these movement skills tasks reflected the gender differences previously noted for these areas (NEMP 2002 and 2006). There was some evidence of students from high decile schools displaying higher levels of movement skills, strategic action skills, and particularly movement sequences skills than students in mid and low decile schools. This was more pronounced at Year 8 than at Year 4. These findings are consistent with NEMP findings from 1998, 2002 and 2006.

# 4

## Understanding Achievement in Health and Physical Education

As described in Chapter 2, the NMSSA health and physical education (PE) assessment programme used student, teacher, and principal questionnaires to collect data focused on a number of contextual factors associated with understanding achievement in health and physical education. This included data related to:

- students' attitudes to health and physical education;
- students' reported opportunities to learn health and physical education at school;
- students' reported frequency of and attitude to physical activity outside school;
- the organisation of health and physical education teaching in the school, including:
  - teachers' attitudes and confidence regarding the teaching of health and physical education
  - teachers' reports of the learning opportunities they provide in the classroom
  - professional support and development for teachers in health and physical education;
- school priorities for aspects of learning areas.

This chapter describes how students, teachers and principals responded to the interviews and questionnaires, and relates the responses to patterns in achievement. Findings are reported separately for health and physical education. Year 4 and Year 8 results are reported together so that comparisons between year levels can be easily made.

For many of the tables, particularly those associated with population sub-groups, fuller tables of means, standard deviations (SD), sample sizes, effect sizes and 95 percent confidence intervals can be found in Appendix 4.

### Understanding achievement in health and physical education – An overview

#### Students attitudes to health and physical education and opportunities to learn

Attitude to Health and Attitude to Physical Education scales were developed to measure the students' responses to questions about their attitudes to these aspects of the learning area. Overall, Year 4 students reported more positive attitudes to health and physical education than at Year 8. The decrease in the average Attitude to Physical Education score from Year 4 to Year 8 was smaller than that for Attitude to Health, which was similar to that reported in NMSSA for mathematics (2013), science, and writing (2012).

The decline in attitude scores between Year 4 and Year 8 was smaller for boys than girls. Although average Attitude to Health scores for girls were higher than for boys at each year level, girls showed a greater decline at Year 8. Boys and girls reported similar scores for Attitude to Physical Education at Year 4. Boys' scores remained the same at Year 8, girls' scores declined.



Overall, the correlation between students' attitudes and achievement in health and physical education was weak, although statistically significant ( $p < .01$ ) for health at Year 8 and for physical education at Year 4. At Year 4, students in the lowest Attitude to Physical Education group achieved significantly lower than those in the middle and highest attitude groups.

Overall, most students at both year levels reported frequent opportunities to learn in health and physical education. Very few students at either year level reported never having the opportunities they were asked about. However, there was no discernible relationship between achievement in Critical Thinking in Health and Physical Education and frequency of learning opportunities in health, and only a weak relationship with two learning opportunities in physical education. More frequent opportunities in PE to learn about safety in movement and to use equipment for play and movement were associated with slightly higher achievement at both year levels.

#### **Students' physical activities outside of school**

About half of all students at each year level reported being physically active outside of school nearly every day, with a further third of students being active 2-3 times a week. Almost half of students at both year levels were able to identify fitness and health benefits of physical activity, and one in five described enjoyment or emotional well-being benefits.

Slightly more than half of all students at both year levels said they would like to do more physical activity, with very few saying they would like to do less.

#### **Teachers' views of teaching health and physical education and professional support**

At both year levels, teachers reported enjoying teaching health and physical education, and feeling confident about it. Teaching confidence was higher overall than that reported for NMSSA English: writing or Science (2012). Teachers were supported in their teaching of physical education by a range of sources with the most frequent assistance being from external providers (45 percent of teachers at Year 4 and 33 percent at Year 8). The use of external providers to deliver health and physical education learning is an issue that requires further exploration.

More than half of Year 8 teachers felt the professional support they received was good or excellent compared to about 40 percent of Year 4 teachers. Perhaps this was related to the greater level of assistance from external providers reported by Year 8 teachers. Over two thirds of Year 4 and Year 8 teachers had received health and physical education professional development in the last two years. This compares to just over 80 percent in NMSSA mathematics and statistics (2013), one third in NMSSA science (2012) and over 85 percent in NMSSA English: writing (2012). Further exploration of the nature and sources of this professional development may also be useful.

#### **Principals' views of the health and physical education learning area**

School principals were asked to rank in order of priority for their school 17 aspects of the learning areas of the NZC. The average ranking for physical education was 7th and 8th for Year 4 and Year 8 respectively, and for health was 11th and 12th. Reading, writing and maths were placed in the top three at both year levels. Year 4 students from schools where health and physical education was a high priority scored lower, on average, in Critical Thinking in Health and Physical Education than those where health and physical education were lower priorities. However, more low decile schools gave health and physical education a higher ranking than mid or high decile schools. Differences in achievement at Year 8 by priority ranking were not significant.

## 1. Year 4 and Year 8 attitudes to health and physical education

Students develop important attitudes and beliefs about health and physical education and their ability as health and physical education learners. Sections of the NMSSA student questionnaire focused on students' attitudes to learning health and their attitudes to learning physical education. This included their sense of self-efficacy in health and physical education and engagement as health and physical education learners. IRT scales were developed to measure the overall strength of each student's attitude. Attitudes scales across different learning areas are not directly comparable as they can have different properties (e.g. raw score standard deviations) that can alter the final standardised scales. Chapter 2 describes this section of the questionnaire and the Attitude to Health and Attitude to Physical Education scales in more detail. Results are presented first for health and then for physical education.

### Attitude to health

Figure 4.1 displays the distribution of scale scores on the Attitude to Health measure for Year 4 and Year 8 students. Scores on average became less positive between Year 4 and Year 8.

Table 4.1 shows the average Attitude to Health scale score and standard deviation for each year level. The average scale score is 7 scale score units lower in Year 8 than Year 4. This decline in the average scores represents a statistically significant effect size of -0.36 and is consistent with findings in other learning areas reported in other studies (for example, TIMSS, 2011/12; NEMP, 1998, 2002, 2006; and NMSSA English: writing and Science, 2013).

Table 4.2 breaks down the results for girls and boys at both year levels. Boys had lower average Attitude to Health scores than girls in Year 4 and Year 8.

However, the difference was less at Year 8. For both girls and boys the difference between the Year 4 and Year 8 average scores was statistically significant.

Girls scored 9 scale score units lower on the scale (equivalent to an average annual effect size of -0.51), and boys scored 5 scale score units lower (equivalent to an average annual effect size of -0.24) at Year 8.

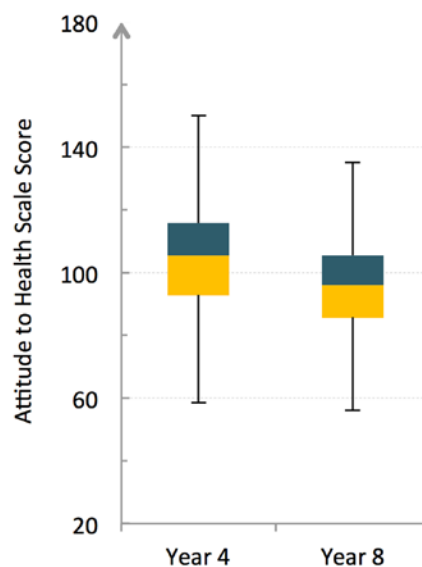


Figure 4.1 Year 4 and Year 8 student scale scores for Attitude to Health

Table 4.1 Year 4 and Year 8 Attitude to Health and difference by year level

	Year 4	Year 8
Average (scale score units)	104	96
SD (scale score units)	21	19
N	2067	2066
Difference in average		-7
Effect size		<b>-0.36</b>

Effect sizes in bold are statistically significant ( $p < .05$ )

Table 4.2 Year 4 and Year 8 Attitude to Health for boys and girls

	Boys		Girls	
	Year 4	Year 8	Year 4	Year 8
Average (scale score units)	100	95	108	98
SD (scale score units)	23	19	19	18
N	1046	1055	1021	1011
Difference in average		-5		-9
Effect size		<b>-0.24</b>		<b>-0.51</b>

Effect sizes in bold are statistically significant ( $p < .05$ )

Figures 4.2 and 4.3 display the Attitude to Health results by sub-group for Year 4 and Year 8 respectively. The sub-groups shown relate to gender, ethnicity<sup>14</sup>, school decile<sup>15</sup> and type of school<sup>16</sup>. Generally the spread of attitude scores for each sub-group was larger at Year 4 than at Year 8, and the median attitude score for each sub-group at Year 8 was lower than that at Year 4. At Year 4, girls, Pasifika students and students attending composite schools tended to be more positive than their corresponding comparison groups. At Year 8 the median scores of all sub-groups were more similar than at Year 4.

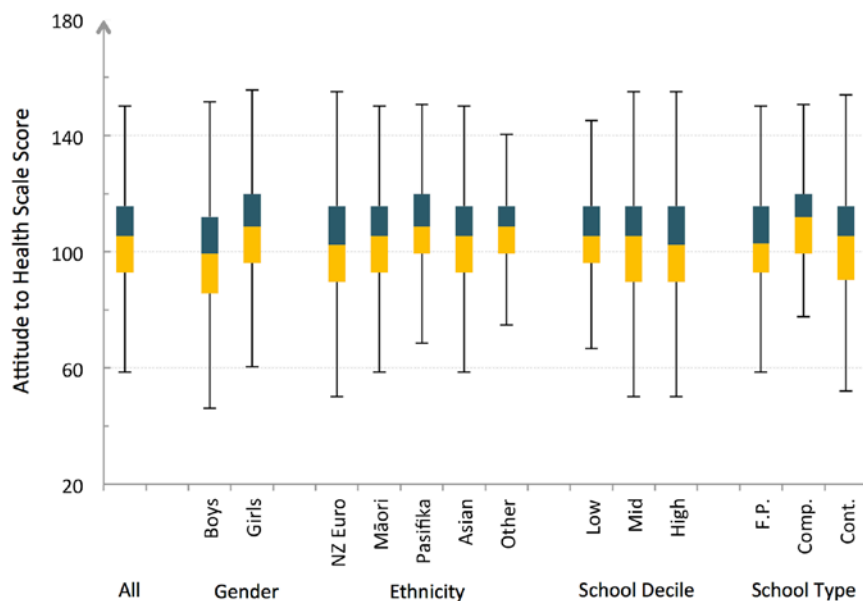


Figure 4.2 Year 4 student Attitude to Health scores by gender, ethnicity, school decile and type (NZ Euro = NZ European, F.P. = Full Primary, Comp. = Composite, Cont. = Contributing)

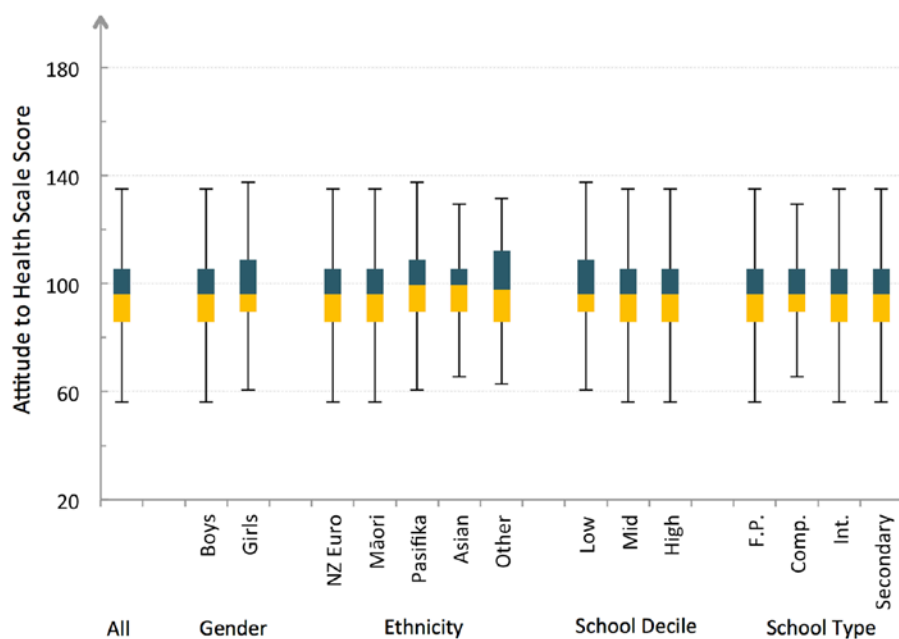


Figure 4.3 Year 8 student Attitude to Health scores by gender, ethnicity, school decile and type (NZ Euro = NZ European, F.P. = Full Primary, Comp. = Composite, Int. = Intermediate)

<sup>1</sup> Non-prioritised ethnicity was used where students could identify with up to three ethnicities. This meant they could be present in multiple ethnic groups. Student ethnicity data were obtained from student NSN information held on the Ministry of Education ENROL database. The 'NZ European' category included NZ Pākehā only. The 'Pasifika' category included Tokelauan, Fijian, Niuean, Tongan, Cook Islands Māori, Samoan and other Pacific peoples. The 'Asian' category included Filipino, Cambodian, Vietnamese, Other Southeast Asian, Indian, Chinese, Sri Lankan, Japanese, Korean, and other Asians. The 'Other' category included Australians, British/Irish, German, Dutch, Greek, Polish, South Slav, Italian and other Europeans, Middle Eastern, Latin American, African, and Not Stated.

<sup>2</sup> Low decile schools (1-3); Mid decile schools (4-7); High decile schools (8-10) (<http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/SchoolOperations/Resourcing/OperationalFunding/Deciles.aspx>)

<sup>3</sup> Full Primary (Year 1 – 8); Contributing (Year 1 – 6); Intermediate (Year 7 – 8); Composite (Year 1- 13); Secondary (Year 7-13)

## Attitude to Physical Education

Figure 4.4 displays the distribution of scale scores on the Attitude to Physical Education measure for Year 4 and Year 8 students. The decrease in average scores between Year 4 and Year 8 was very small and notably less than for Attitude to Health.

Table 4.3 shows the average Attitude to Physical Education scale score and standard deviation for each year level. The average scale score was 4 scale score units lower in Year 8 than Year 4. This small decline in the average scores represents an effect size of -0.18 and is statistically significant. It is consistent with the findings described above for other learning areas.

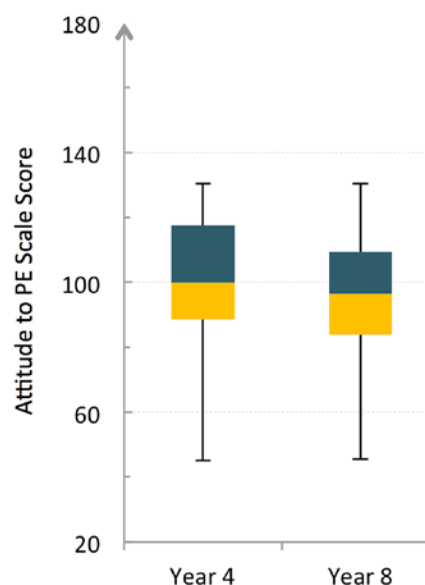


Figure 4.4 Year 4 and Year 8 student scale scores for Attitude to PE

Table 4.3 Year 4 and Year 8 Attitude to PE and difference by year level

	Year 4	Year 8
Average (scale score units)	102	98
SD (scale score units)	19	21
N	2067	2064
Difference in average		-4
Effect size		<b>-0.18</b>

Effect sizes in bold are statistically significant ( $p < .05$ )

Table 4.4 breaks down the results for girls and boys at both year levels. Boys and girls had similar average scores in Year 4. However girls' average score declined by 7 scale score units between Year 4 and Year 8 (equivalent to an average annual effect size of -0.34), while boys' average scores for Attitude to Physical Education remained at the same level.

Table 4.4 Year 4 and Year 8 Attitude to PE for boys and girls

	Boys		Girls	
	Year 4	Year 8	Year 4	Year 8
Average (scale score units)	103	103	100	94
SD (scale score units)	19	20	18	21
N	1046	1056	1021	1008
Difference in average		-1		-7
Effect size		-0.03		<b>-0.34</b>

Effect sizes in bold are statistically significant ( $p < .05$ )

Figures 4.5 and 4.6 display the Attitude to Physical Education results by sub-group for Year 4 and Year 8 respectively. Unlike Attitude to Health, the spread of attitude scores for each sub-group was generally similar at Year 4 and Year 8. However, the median attitude score for each sub-group at Year 8 was lower than that at Year 4 and more variable. The greatest differences between medians at Year 8 were for gender (boys higher than girls), ethnicity (Pasifika students higher and Asian students lower) and decile (low decile group higher).

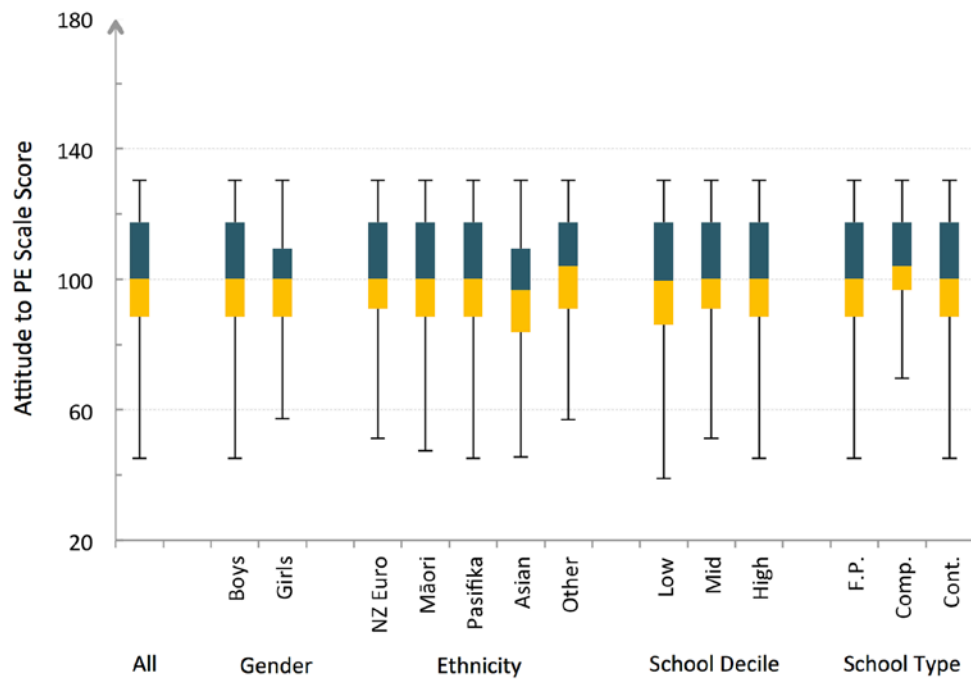


Figure 4.5 Year 4 student Attitude to PE scores by gender, ethnicity, school decile and type (NZ Euro =NZ European, F.P.=Full Primary, Comp. = Composite, Cont. = Contributing)

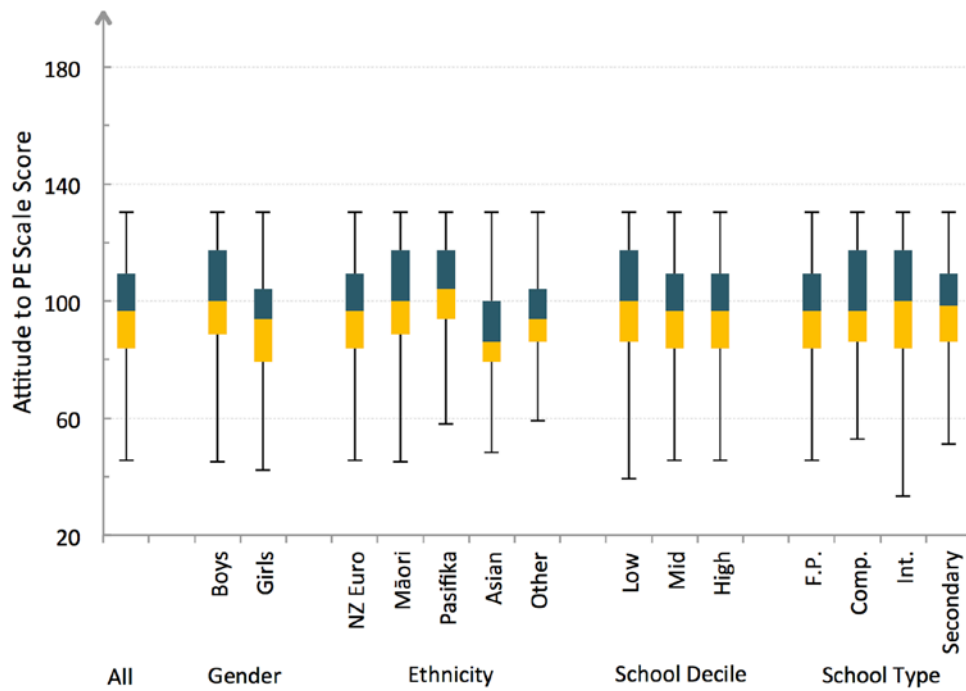


Figure 4.6 Year 8 student Attitude to PE scores by gender, ethnicity, school decile and type (NZ Euro= NZ European, F.P.=Full Primary, Comp. = Composite, Int. = Intermediate)

## Relationship between attitudes to health and physical education achievement

Table 4.5 shows the relationship between achievement in Critical Thinking in Health and Physical Education and Attitude to Health and Attitude to Physical Education using the Pearson product-moment correlation coefficient ( $r$ ). Overall, the relationship was relatively weak, although statistically significant ( $p < .01$ ) for health at Year 8 and for physical education at Year 4.

Table 4.5 Correlations between Attitude to Health, Attitude to PE and Critical Thinking in Health and PE at Year 4 and 8

	Attitude to Health with Critical Thinking in Health and PE ( $r$ )	Attitude to PE with Critical Thinking in Health and PE ( $r$ )
Year 4	-0.02	0.11*
Year 8	0.16*	0.04

\* statistically significant at ( $p < .01$ )

Figures 4.7 to 4.10 show how groups of students with lowest, middle, and highest attitude scores achieved on the health and physical education measure at Year 4 and Year 8. To construct these graphs, three reporting groups were defined on the basis of the Attitudes to Health and Physical Education scale scores: the lowest group of students was made up of students in the bottom quartile of scores on the Attitude to Health and Attitude to Physical Education scales; the middle group represented the students who scored between the 25th and 75th percentile; and the highest group represented the students who scored in the upper quartile.

Tables 4.6 and 4.7 show the differences in average scores on Critical Thinking in Health and Physical Education between the three Attitude to Health and Attitude to Physical Education score groups for Year 4 and Year 8 students. An effect size related to each difference is also reported.

Although the relationship between attitude and achievement was weak, lowest attitude groups in both health and physical education achieved at a lower level than highest attitude the groups at Year 8, and in physical education at Year 4 also. These differences could be due to the different priorities given to health and physical education at the different year levels, the changes in attitude between Year 4 and Year 8, or to other factors not considered in this study.

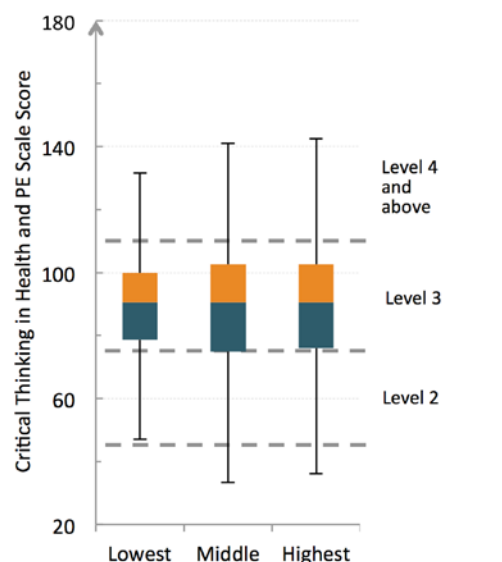


Figure 4.7 Year 4 student achievement scores by level of Attitude to Health

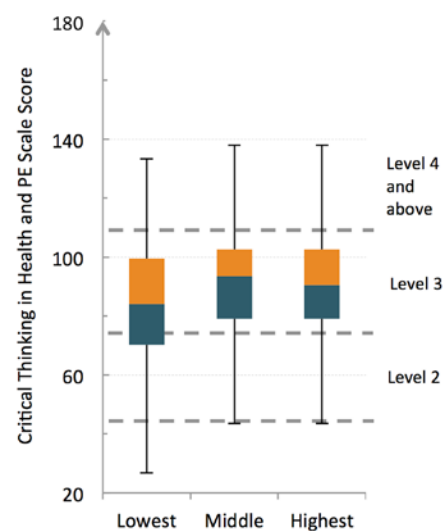


Figure 4.8 Year 4 student achievement scores by level of Attitude to PE

Table 4.6 Year 4 students: Differences in average achievement by level of Attitude to Health/Attitude to PE

	Critical Thinking in Health and PE with Attitude to Health		Critical Thinking in Health and PE with Attitude to PE	
	Difference (scale score units)	Effect Size	Difference (scale score units)	Effect Size
Lowest/Middle	0	0.01	-7	<b>-0.33</b>
Middle/Highest	0	-0.02	0	0.01
Lowest/Highest	0	-0.01	-7	<b>-0.32</b>

Effect sizes in bold are statistically significant ( $p < .05$ )

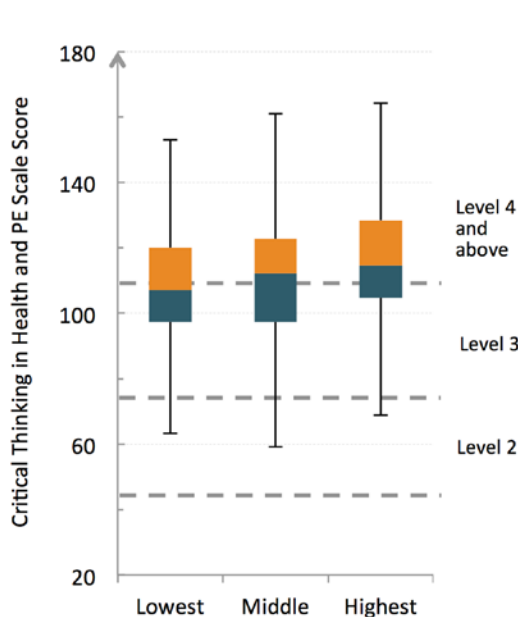


Figure 4.9 Year 8 student achievement scores by level of Attitude to Health

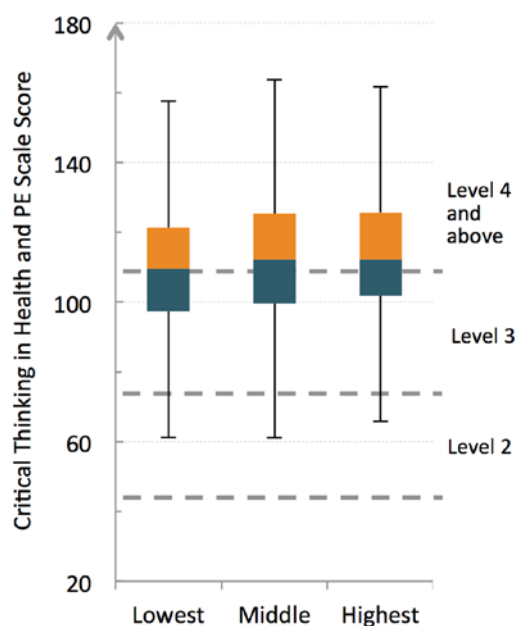


Figure 4.10 Year 8 student achievement scores by level of Attitude to PE

Table 4.7 Year 8 students: Differences in average achievement by level of Attitude to Health/Attitude to PE

	Critical Thinking in Health and PE with Attitude to Health		Critical Thinking in Health and PE with Attitude to PE	
	Difference (scale score units)	Effect Size	Difference (scale score units)	Effect Size
Lowest/Middle	-3	-0.15	-1	-0.06
Middle/Highest	-4	-0.20	-2	-0.08
Lowest/Highest	-7	<b>-0.35</b>	-3	-0.15

Effect sizes in bold are statistically significant ( $p < .05$ )

## 2. Opportunities to learn health and physical education at school

As part of the student questionnaire students were asked to rate how frequently they were involved in a range of health and physical education learning experiences at school. The results that are presented in this report are for the specific range of opportunities that students were asked about. These were broad categories of opportunity and students answered using a response scale that ranged from ‘Not at all’ to ‘Heaps’. (See Chapter 2 for details on these statements).

Figures 4.11 and 4.12 show how frequently students in Year 4 and Year 8 reported being involved in a range of health activities. Year 4 students reported higher frequencies of learning opportunities than Year 8 but with the same pattern of response. Almost 70 percent of students said that they frequently took action to improve their health after learning something about health in class, and that they learned something that was important to them. A smaller proportion (40 to 50 percent) reported frequently doing whole class activities in health, sharing things they learned with others, and working in groups to think about and discuss things in health. Very few students at Year 4 or Year 8 (4 to 7 percent) reported never learning something that was important to them in health or never taking action to improve their health after learning something in class.

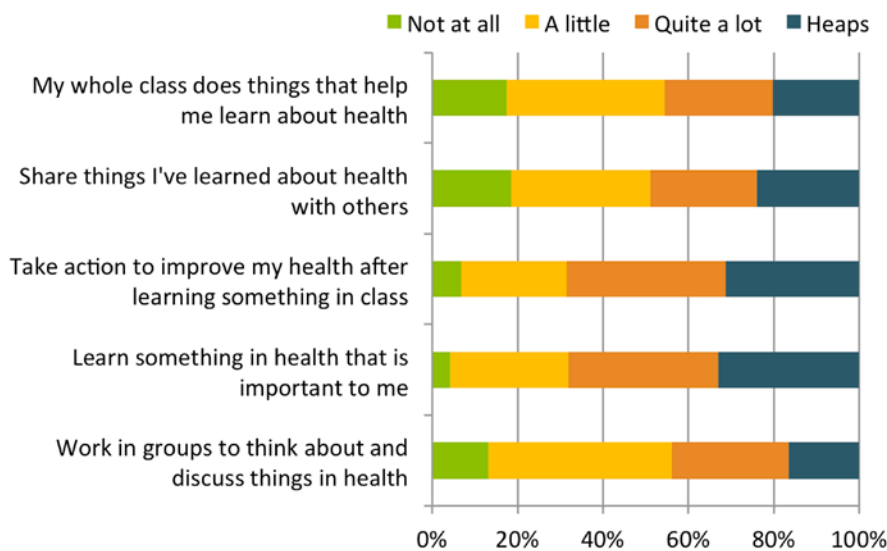


Figure 4.11 Frequency of health activities reported by Year 4 students

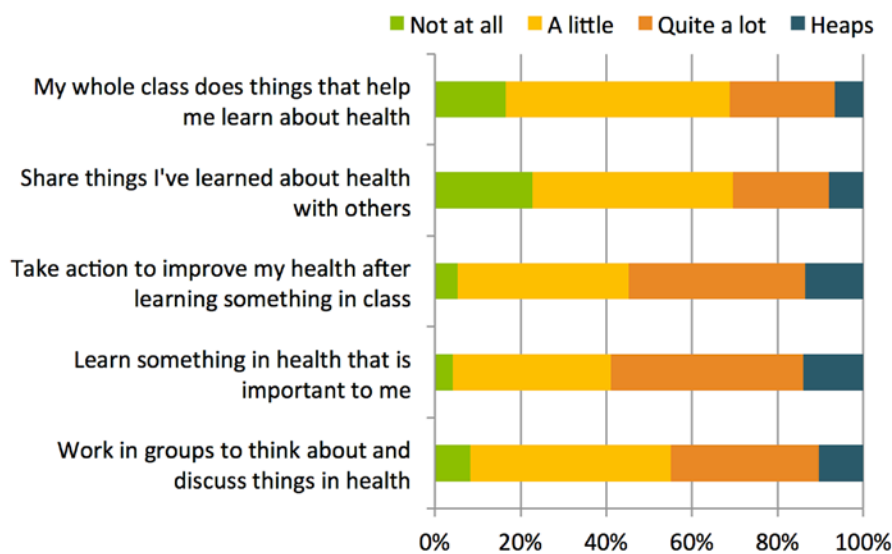


Figure 4.12 Frequency of health activities reported by Year 8 students



Overall students reported a high level of learning opportunities in physical education at both year levels. Reports by Year 4 and Year 8 students were very similar overall, suggesting that physical education activities were experienced at similar frequencies at both year levels. About 80 percent of Year 4 and Year 8 students reported frequent opportunities to learn new skills and different ways of moving; how to be safe when moving in different ways; about playing fair; working in teams or groups; and using equipment to play and move around. Year 8 students reported slightly more team or group work activities than Year 4 students. Only one to four percent of students at either year level reported never having these learning opportunities. About 60 percent of Year 4 and 50 percent of Year 8 students said they had frequent opportunities to make up movement patterns or solve movement challenges. Eight to nine percent of students at both year levels said they never had these opportunities.

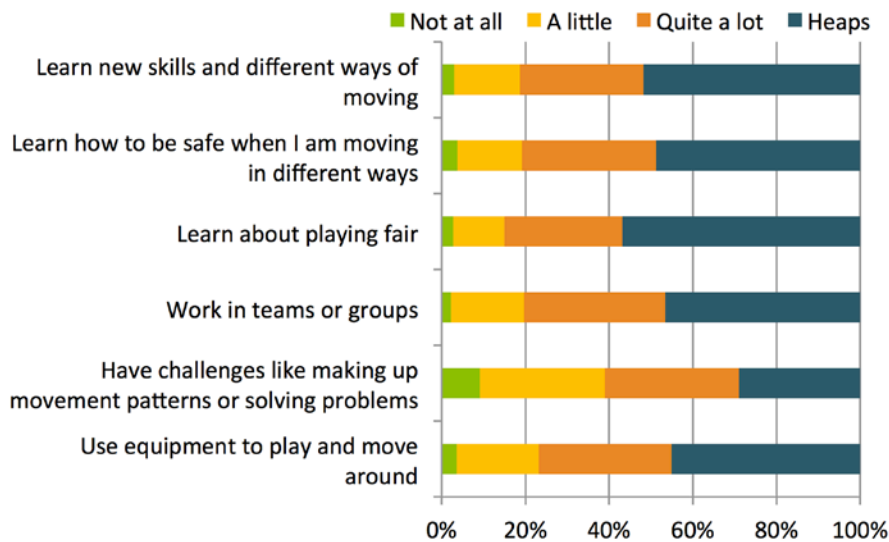


Figure 4.13 Frequency of PE activities reported by Year 4 students

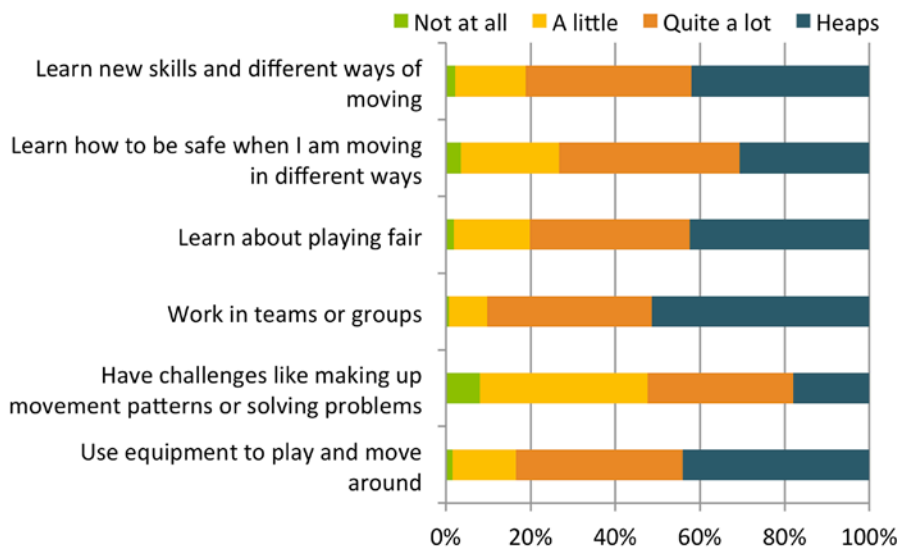


Figure 4.14 Frequency of PE activities reported by Year 8 students

## Relationship between opportunities to learn and achievement in health and physical education

The relationship between student-reported opportunities to learn and achievement in Critical Thinking in Health and Physical Education was examined for each statement. Pair-wise comparisons between the scale scores on Critical Thinking in Health and Physical Education were made for each category of opportunities to learn group, and effects sizes of differences determined. (See Appendix 4).

There were no statistically significant differences in achievement for any statement between students who reported different levels of opportunities to learn health at either year level.

In physical education, only small differences were observed for two statements in physical education. Students at Year 4 who reported frequently 'learning how to be safe when moving in different ways' scored significantly higher than those who reported never receiving these opportunities. At Year 8, students who reported having frequent opportunities 'to use equipment to play and move around' achieved at a significantly higher level than those who reported having very few opportunities to do this.

Overall, we observed a very weak relationship between the Opportunities to Learn responses and Critical Thinking in Health and Physical Education scores. Given that we might expect to observe a stronger association between opportunities to learn and achievement scores, some possible explanations for this could be:

- students' perception of their opportunities for learning may vary amongst students who have the same opportunities;
- the questions in the student questionnaire may not encapsulate 'opportunities for learning in health and physical education' concisely enough to render an observable result;
- the relationship may exist, but be 'indirect', or have a 'lag', that is this year's opportunity for learning in the classroom may affect next year's achievement, but not this year's.

The question of the relationship between opportunities to learn in health and physical education and achievement in health and physical education remains open and needs further research.

### 3. Frequency of physical activity outside of school

The NMSSA assessment explored how much physical activity students engaged in outside of school, and what benefits students believed physical activity provides. Students were asked 'how often do you do physical activities outside of school like sport, swimming, dance, kapa haka, horse riding, skateboarding, biking?' This question encouraged a broad definition of being physically active. Students used a response scale of 'nearly every day, 2-3 times a week, about once a week, or hardly ever' to describe the frequency of their activity. Students were also asked what physical activities they liked doing and why it was good for people to do activities like these. This information assists in building a picture of the extent to which students at these year levels understand the range of benefits of physical activity and how they have incorporated it into their daily lives. It provides information on the proportion of students who are rarely active through to very active. It is not intended to provide detailed assessment of those students engaging in high levels of physical activity. Percentage frequencies reported in tables in this section may not always sum to 100 percent due to rounding.

Table 4.8 displays the percentage of boys and girls at Year 4 and Year 8 who said they were physically active nearly every day, 2-3 times a week, about once a week, and hardly ever. Almost half of all Year 4 students (46 percent) said they were active nearly every day and that percentage increased at Year 8 (52 percent). Approximately another third (33 percent and 37 percent at Year 4 and Year 8 respectively) were physically active 2-3 times a week. Slightly more girls than boys reported being physically active nearly every day at Year 4, however that pattern was reversed at Year 8. Approximately one in five Year 4 students was physically active about once a week or less, and this fell to approximately one in ten at Year 8.

Table 4.8 Percentage of students reporting frequency of physical activity outside of school by year and gender

	Year 4			Year 8		
	All (%)	Boys (%)	Girls (%)	All (%)	Boys (%)	Girls (%)
Nearly every day	46	44	49	52	55	50
2-3 times a week	33	33	33	37	37	38
About once a week	14	15	14	7	4	9
Hardly ever	7	8	4	4	4	4

Students were asked to name physical activities they enjoyed doing and explain why it was good for people to do activities like these. This question explored the extent to which students understood that physical activity has benefits beyond fitness and losing weight. Student responses were categorised into eight types of benefits of activity, seven of which related to well-being and an ‘other’ category for non well-being-related responses. The full descriptors for each coding category are included in Table 4.9.

Table 4.9 displays benefits of physical activity expressed by students in Years 4 and 8 and by boys and girls. Boys and girls responded very similarly on all items.

The most common benefit students at both year levels gave for why physical activity was good for people was that it helps them stay fit and healthy (48 percent at Year 4 and 43 percent at Year 8). This was followed by just over 20 percent of the students who believed it was fun and enjoyable. Five percent of students at Year 4 and 11 percent at Year 8 described social benefits of physical activity.

Viewed together these findings suggest that students were mostly aware of the physical health benefits of being physically active, and the enjoyment and fun to be gained from being involved. Far fewer students demonstrated awareness of other well-being benefits.

Table 4.9 Percentage of Year 4 and Year 8 student perceived benefits of physical activity

Benefit of Activity	Year 4			Year 8		
	All (%)	Boys (%)	Girls (%)	All (%)	Boys (%)	Girls (%)
Keep fit/healthy/not be lazy/keep busy	48	49	47	43	44	42
Fun/enjoyable/makes you feel happy or good	22	21	23	23	22	24
Having the experience/learn new things/developing skills/career	7	8	6	6	7	5
Social – be with friends/family/be in a team	5	5	5	11	10	12
Be outside/in the fresh air	4	2	5	4	4	4
Lose weight/not get fat	3	3	2	2	3	2
Challenge/thrill/excitement/stepping outside comfort zone	1	2	1	2	2	2
Other (not benefit related)	10	10	10	7	8	7

Table 4.10 shows the percentage of boys and girls at Year 4 and Year 8 who indicated they would like to do more, less, or about the same level of physical activity as they were currently doing. Just over half of all students at both year levels (54 percent) said they would like to do more physical activity, and just under half (43 and 44 percent) said they would like to do about the same. Very few said they would like to do less.

Table 4.10 Percentage of Year 4 and Year 8 students who would like to do a different amount of physical activity by year and gender

	Year 4			Year 8		
	All (%)	Boys (%)	Girls (%)	All (%)	Boys (%)	Girls (%)
More	54	50	59	54	52	56
About the same	43	45	39	44	46	41
Less	3	5	1	2	2	2

Students who said that they would like to do more physical activity were asked if they could identify ‘any things that make it hard for you to do more?’ Barriers to doing more physical activity were recorded during interviews and coded into categories of health, access, financial, busy with other things, and family circumstances. Table 4.11 displays the numbers of students who responded to this question, and the percentages of boys and girls at Year 4 and Year 8 who responded in these categories. Although over 50 percent of students at each year level said they would like to do more physical activity, at Year 4 only 13 percent were able to identify specific barriers to activity. At Year 8, that proportion doubled.

The most common barrier to more frequent physical activity was students being busy with other things (46 percent at each year), followed by health reasons (29 percent at year 4 compared to 22 percent at Year 8), and family circumstances (18 percent compared to 13 percent). Access and financial issues were regarded as barriers by a very small percentage of students. Gender differences were small and different at each year level. At Year 4, boys were more likely to cite family circumstances as a barrier (23 percent compared to 16 percent) while girls were more likely to describe being busy with other things as a barrier (49 percent compared to 40 percent). At Year 8, this pattern had changed with more girls citing family circumstances (16 percent compared to 11 percent) and more boys citing health issues as a barrier (26 percent compared to 18 percent).

Table 4.11 Percentage of students identifying types of barriers to do doing more physical activity outside of school by year and gender

	Year 4			Year 8		
	All (%)	Boys (%)	Girls (%)	All (%)	Boys (%)	Girls (%)
Health	29	30	29	22	26	18
Access	2	3	2	14	14	15
Financial	5	5	5	5	4	6
Busy with other things	46	40	49	46	45	46
Family Circumstances	18	23	16	13	11	16

## 4. Teaching health and physical education at Year 4 and Year 8

Up to three teachers per school were asked to complete a questionnaire about the teaching of health and physical education at Year 4 or Year 8. Where one existed, the specialist teacher of health and/or physical education completed one of the questionnaires. At Year 4, 176 teachers completed the questionnaire (this included 6 specialists) and at Year 8 the number was 186 (including 16 specialists). This group of teachers is not nationally representative, but there were the teachers of the nationally representative sample of students that participated in NMSSA.

### Teacher attitudes and confidence in teaching health and physical education

Teachers were asked to respond to statements such as ‘I personally enjoy the learning area of Health’ and ‘I feel confident about teaching Health’ using a 4-point response scale that indicated whether the statement was ‘Not at all true for me’, ‘Slightly true for me’, ‘Moderately true for me’, or ‘Very true for me’. Figures 4.15 and 4.16 report the findings for health, and Figures 4.17 and 4.18 report the findings for physical education.

## Health

Overall, at both year levels, teachers responded positively regarding their enjoyment of health, how much they liked teaching it, and their confidence to teach it. Over 80 percent of teachers reported that it was ‘moderately’ or ‘very true for them’ that they were confident in responding to difficult questions from students, were able to adjust lessons as appropriate to respond to the needs of individual students, were able to teach a diverse range of students, and were able to draw on students’ backgrounds and experiences to support their learning.

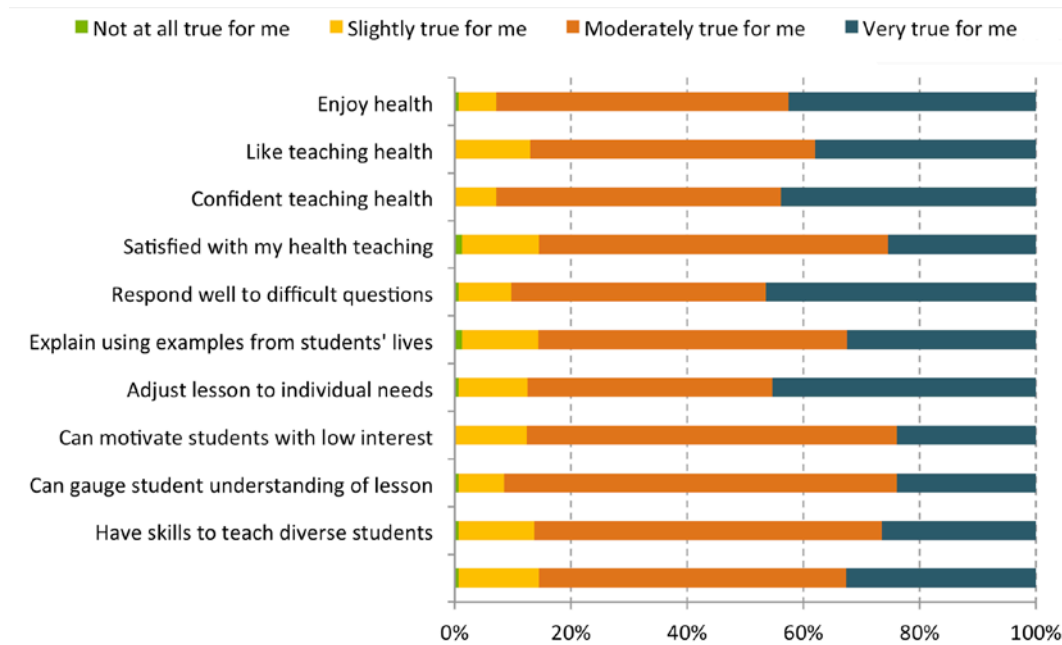


Figure 4.15 Year 4: Distribution of teachers’ attitude to teaching health

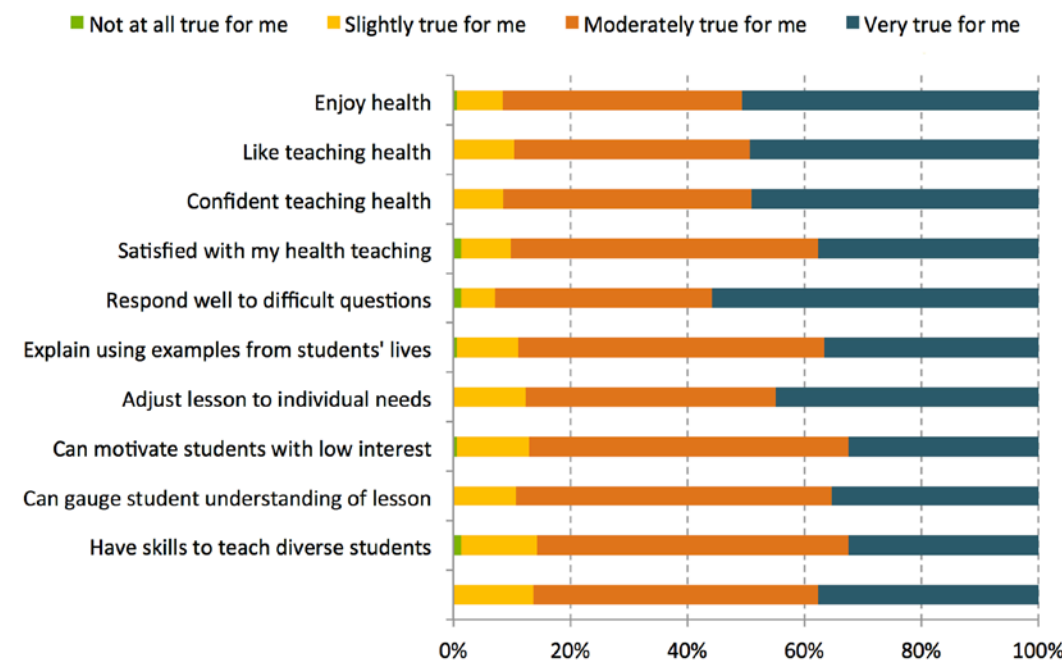


Figure 4.16 Year 8: Distribution of teachers’ attitude to teaching health

## Physical education

Teachers' reports of their attitudes to teaching physical education were similarly very positive. Over 80 percent of teachers endorsed all of the items as 'moderately' or 'very true for them'. Statements related to their enjoyment and confidence in teaching physical education, their ability to respond to difficult questions, to tailor teaching to individual needs, to motivate students with low interest, and their skills to teach a diverse range of students.

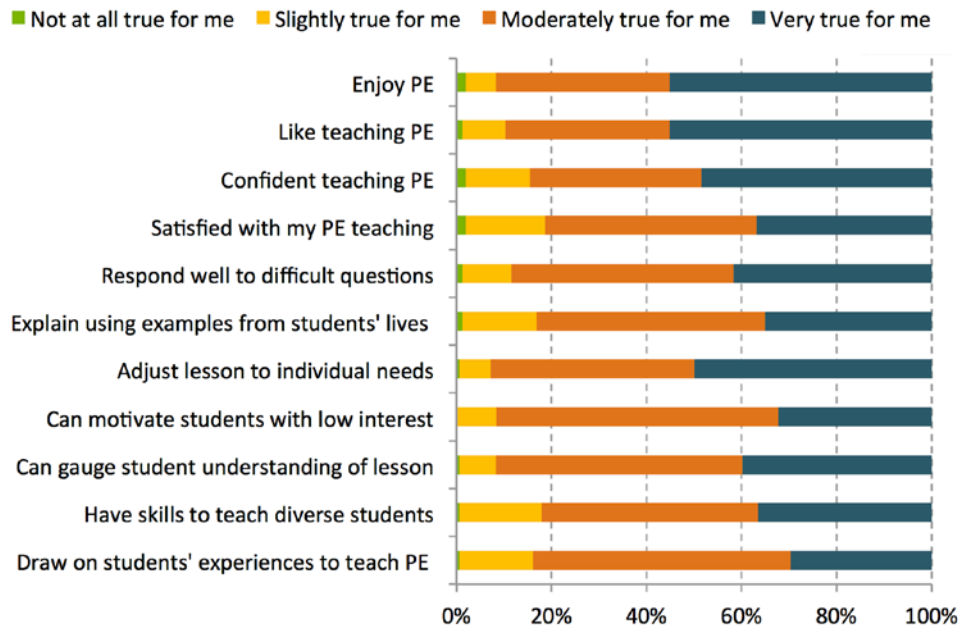


Figure 4.17 Year 4: Distribution of teachers' attitude to teaching PE

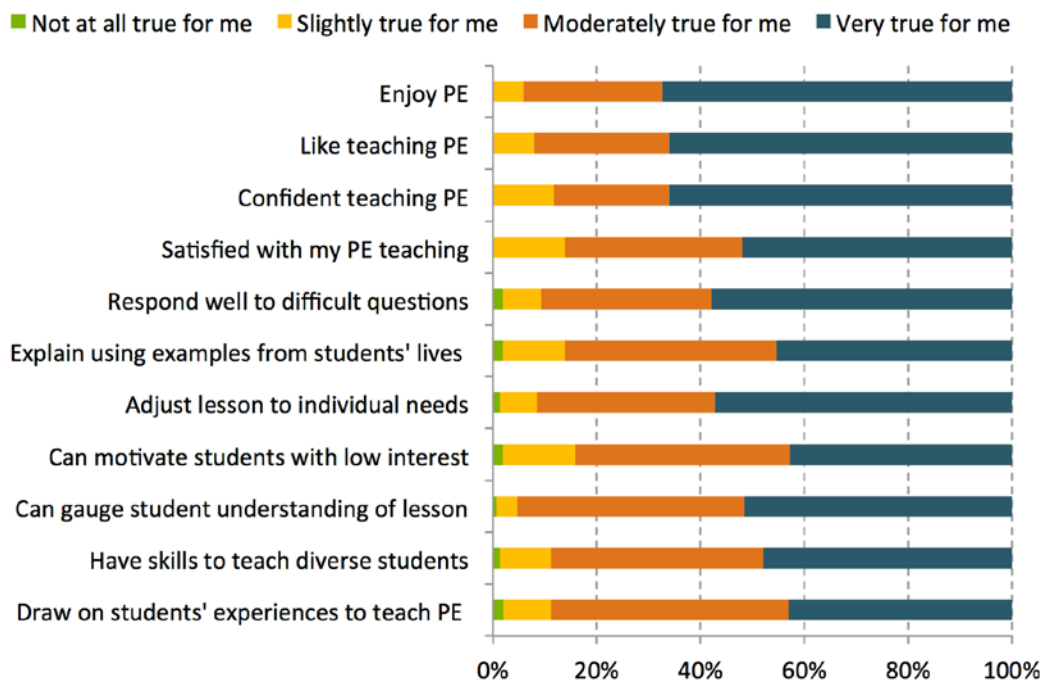


Figure 4.18 Year 8: Distribution of teachers' attitude to teaching PE

## Health and physical education activities provided by teachers in the classroom

Teachers were asked to report how frequently students in their class were involved in a range of activities to learn health. Their responses are displayed in Figure 4.19 for Year 4 and Figure 4.20 for Year 8.

At both year levels, the most frequently reported opportunities teachers provided for students to learn in health were taking part in whole class activities and working in groups to discuss topics in health. Fifty to 60 percent of Year 4 teachers reported these activities happening once a week or more often for their class. At Year 8, these figures were higher at about 70 percent.

Forty percent of Year 4 teachers reported, that once a week or more frequently, students shared things they had learned in health with others and studied topics connected to their cultural or community knowledge. At Year 8, more teachers reported students sharing things they had learned with others on a weekly or more frequent basis, but slightly fewer teachers reported studying topics, weekly or more often, that related to students' cultural knowledge.

Less frequent activities included taking part in whole school activities to learn about health, and accessing health education from experts or visitors to the classroom. About 75 to 85 percent of teachers at both year levels reported these activities occurring about once a month or less frequently.

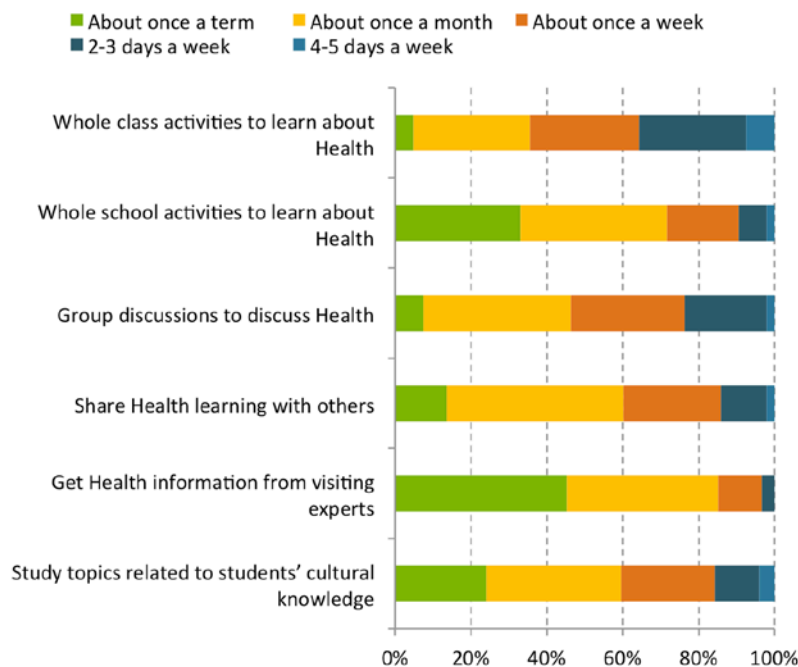


Figure 4.19 Year 4: Percentage of teachers providing different opportunities for students to learn health

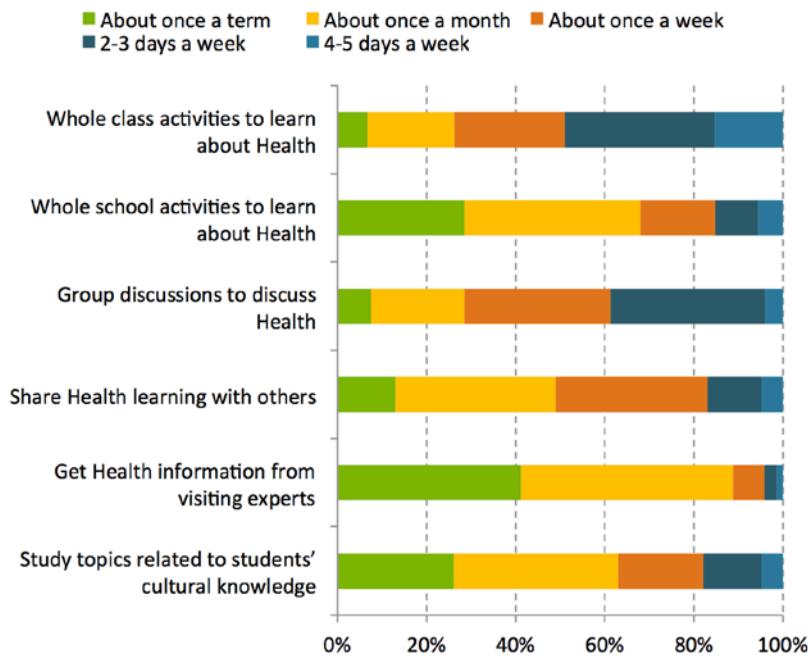


Figure 4.20 Year 8: Percentage of teachers proving different opportunities for students to learn health

Figures 4.21 and 4.22 present the teachers' responses for frequency of learning opportunities in physical education at Year 4 and Year 8. Results were broadly similar for Year 4 and Year 8. According to teachers' reports, the activities that students most often experienced were playing games, using equipment to move around, learning different ways to be active, working in teams or groups, playing sports, and taking part in fitness activities. Students had fewer opportunities to study topics related to their cultural knowledge or make up movement patterns. Having visiting experts in the classroom was the least frequent activity, happening once a month or less for more than 80 percent of teachers.

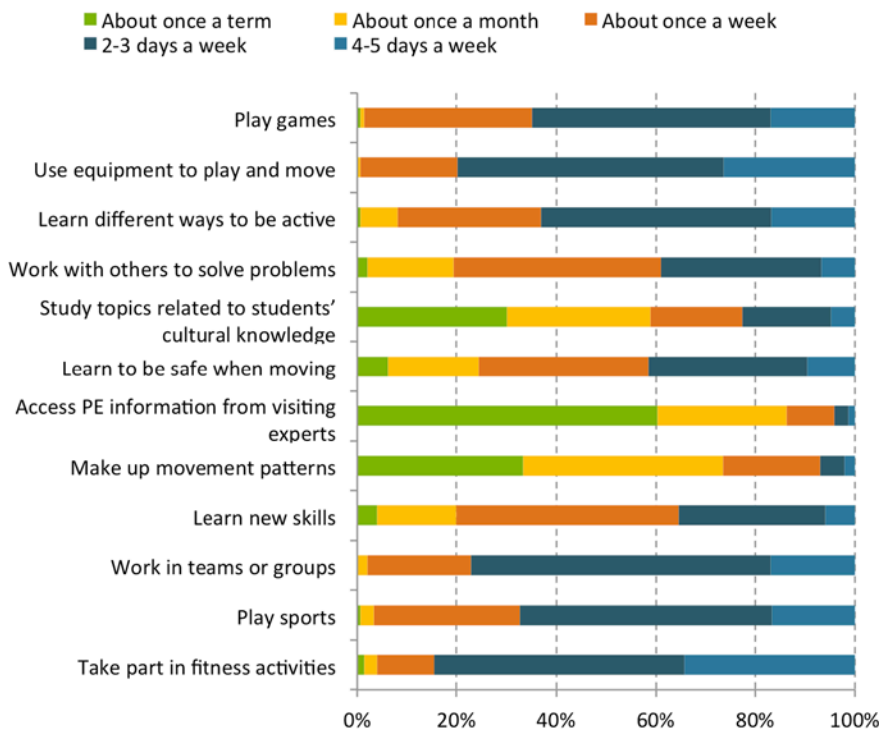


Figure 4.21 Year 4: Percentage of teachers providing different opportunities for students to learn PE



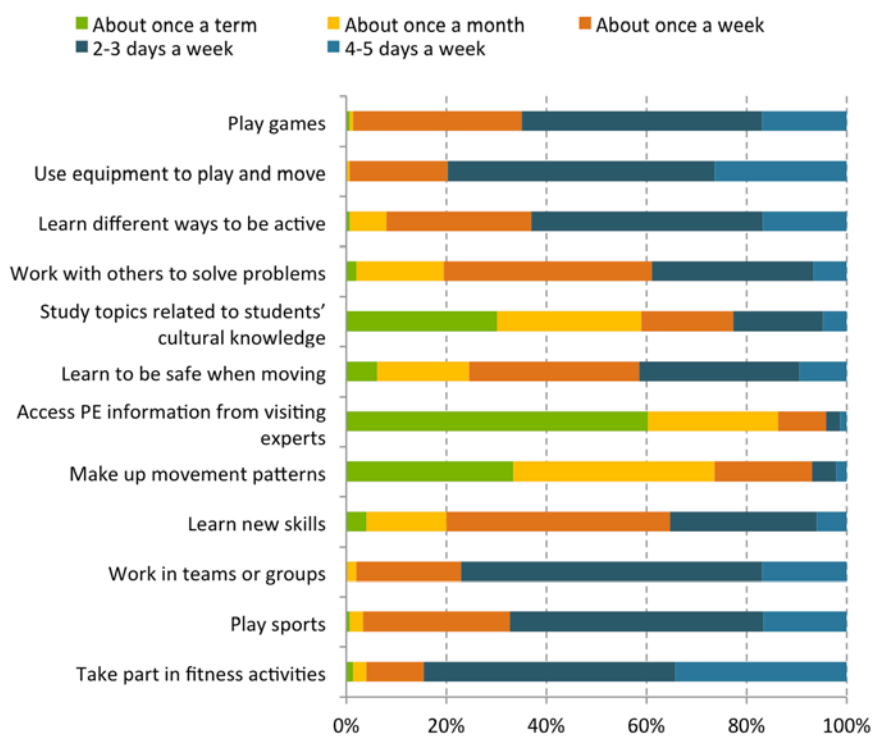


Figure 4.22 Year 8: Percentage of teachers providing different opportunities for students to learn PE

A greater percentage of Year 8 (40 percent) than Year 4 teachers (30 percent) reported having experts visit their classroom about once a month. At Year 4 almost 60 percent of teachers reported students having fitness activities 4-5 days per week. At Year 8 that had fallen to less than 40 percent with a larger group reporting students had fitness 2-3 days per week. Overall however, teachers reported that students participated frequently in a range of physical education activities.

### Comparing student and teacher perceptions of opportunities to learn

Students and teachers were asked some parallel questions about the frequency of some classroom activities related to health and physical education, although the wording was slightly different in the two questionnaires. Tables 4.12 and 4.13 show the percentages of students and teachers at each year level who reported high frequency (once a week or more for teachers, and 'quite a lot' or 'heaps' for students) of activities listed in the parallel questions.

Overall, teachers reported higher frequencies of comparable activities in health than students. The biggest difference at each year level was that teachers reported a greater frequency of whole class learning activities than students. This may be due in part to the more qualified wording of the student statement that said 'my whole class does things that help me learn about health'. Differences between student and teacher responses were more pronounced at Year 8 than Year 4.

In physical education, student and teacher reports were very similar on most parallel items. However, students at each year level rated themselves as having more frequent opportunities than teachers did to make up movement patterns and solve problems. This could be due to differences in perception or classification of what these activities mean. At each year level a smaller proportion of students than teachers reported frequent opportunities in physical education to use equipment to play and move.

Table 4.12 Comparison of student and teacher reports of frequent activities in health

Students (%)			Teachers (%)		
My whole class does things that help me learn about health	Year 4	45	Take part in whole class activities to learn about health	Year 4	64
	Year 8	32		Year 8	74
Share things I've learned about health with others	Year 4	49	Share things they have learned about in health with others	Year 4	40
	Year 8	31		Year 8	51
Work in groups to think about and discuss things in health	Year 4	43	Work in groups to discuss topics in health	Year 4	54
	Year 8	45		Year 8	71

Table 4.13 Comparison of student and teacher reports of frequent activities in PE

Students (%)			Teachers (%)		
Learn new skills and different ways of moving	Year 4	83	Learn new skills	Year 4	75
	Year 8	80		Year 8	80
Learn how to be safe when I am moving in different ways	Year 4	80	Learn how to be safe when moving in different ways	Year 4	75
	Year 8	73		Year 8	76
Work in teams or groups	Year 4	80	Work in teams or groups	Year 4	95
	Year 8	92		Year 8	98
Have challenges like making up movement patterns or solving problems	Year 4	64	Make up movement patterns	Year 4	38
	Year 8	50		Year 8	26
Use equipment to play and move around	Year 4	79	Use equipment to play and move around	Year 4	99
	Year 8	82		Year 8	99

### Meeting the differentiated needs of students in health and physical education

Teachers were asked about the strategies they used to meet the differentiated needs of their students in health and physical education. The pattern of their responses, shown in Figure 4.23, was similar at Year 4 and Year 8. Whole class activities were the most commonly used strategy (about 80 percent), followed by different ability level groups within the classroom (almost 60 percent), and different topic or interest groups within the classroom (almost 40 percent). A smaller proportion of teachers reported incorporating community events as a context for learning or receiving specialist advice to adapt the curriculum for learners with special education needs.

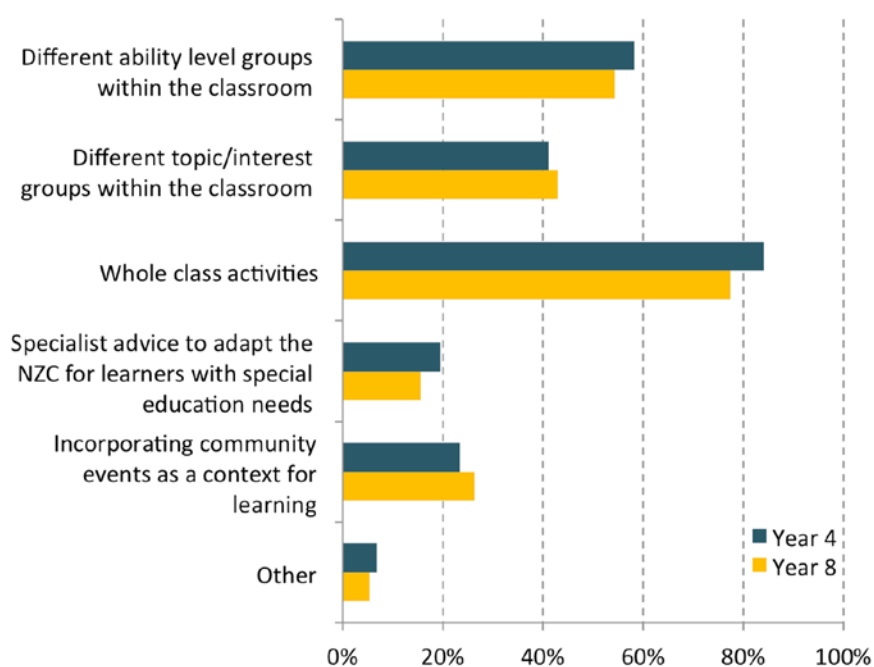


Figure 4.23 Percentage of Year 4 and Year 8 teachers who use techniques to meet the differentiated needs of students for health and PE

## Professional support and development for teachers in health and physical education

Teachers were asked about the sources of assistance they received in the classroom with their teaching of health and physical education. Figure 4.24 shows teachers' responses for each type of support. Support in the classroom was received from a wide variety of sources with external providers making up the largest source at both year levels. Forty-five percent of teachers at Year 4 and more than 30 percent at Year 8 reported that external providers helped with health and/or physical education. Given the widespread use of external providers in the classroom for health and physical education, further exploration of the areas of learning they deliver and how this learning is assessed may be useful. This is reinforced by the conclusion of Dyson, Gordon and Cowan (2011)<sup>17</sup> that the use of external providers for teaching health, and particularly physical education, is now 'ubiquitous in our primary schools' and these programmes need to be evaluated carefully for their learning intentions and outcomes in relation to the health and physical education learning area of the NZC.

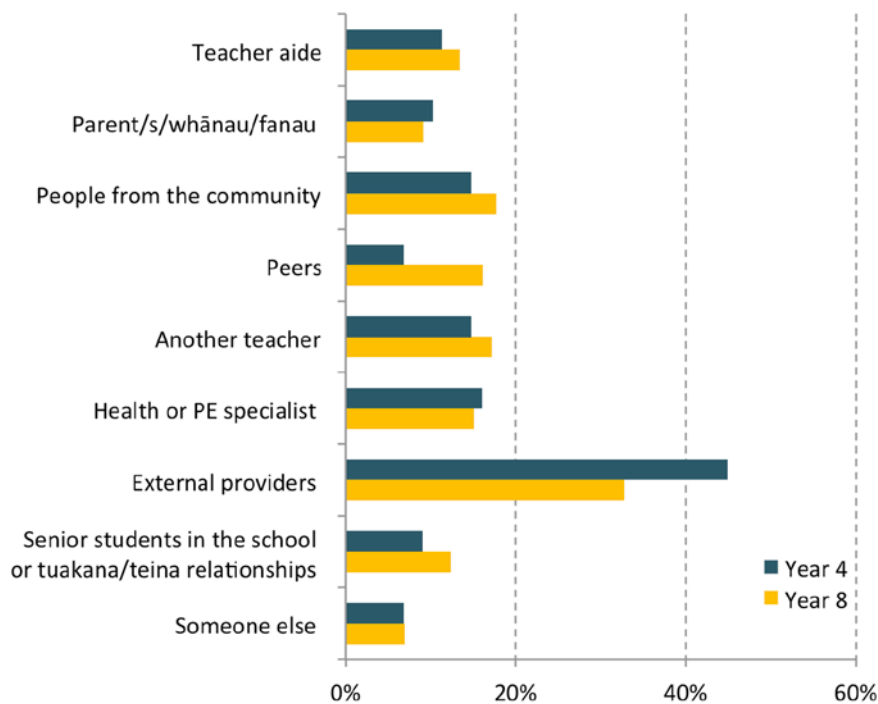


Figure 4.24 Percentage of teachers receiving types of classroom support for teaching health and/or PE by year

Figure 4.25 displays teachers' reports of the level of support they receive from their school in relation to the teaching of health and physical education. Overall, Year 8 teachers reported higher satisfaction than Year 4 teachers with the professional support they receive. Almost 55 percent of Year 8 teachers rated their support as good or excellent in comparison to Year 4 teachers where the figure was 40 percent. No Year 4 teachers reported their support as poor, however about 5 percent of Year 8 teachers did.

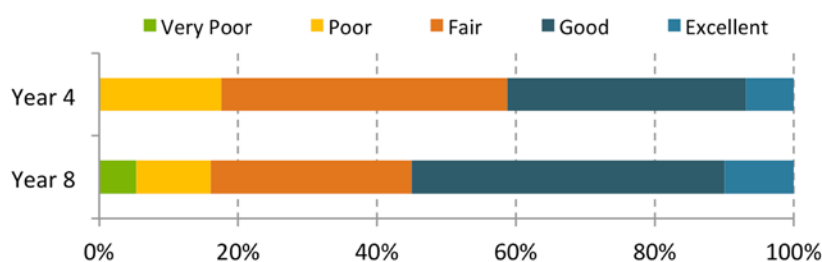


Figure 4.25 Distribution of the level of professional support teachers report getting in HPE

<sup>17</sup> Dyson, B., & Gordon, B., & Cowan (2011) What is physical education in primary schools in Aotearoa/New Zealand? Asia-Pacific Journal of Health, Sport and Physical Education, 2:3-4, 5-16

Figure 4.26 displays how recently Year 4 and Year 8 teachers reported receiving health and physical education professional learning and development (PLD). The figure shows that about 70 percent of Year 4 and Year 8 teachers had received health and physical education PLD in the last two years. This compares to just over 80 percent of mathematics and statistics teachers (NMSSA, 2013), 30 percent of science teachers (NMSSA, 2012), and over 85 percent in English: writing (NMSSA, 2012). About 60 percent of Year 4 and Year 8 teachers had PLD in the past 12 months, and about 5 percent or fewer teachers at each year level reported never having received health and physical education PLD.

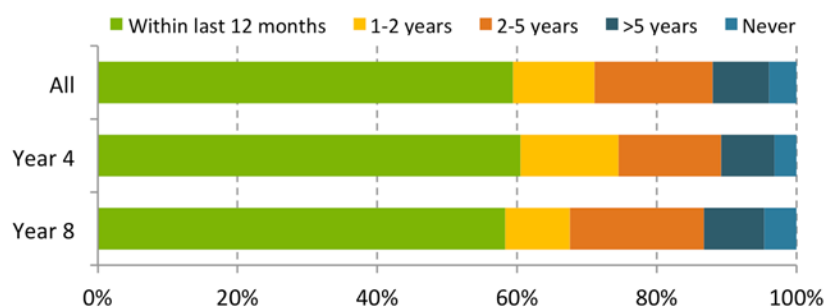


Figure 4.26 Percent of teachers reporting PLD opportunities in health and PE in the past five years

## 5. The place of health and physical education in the overall teaching programme

School principals at Year 4 and Year 8 were asked to rank 17 aspects of the NZC learning areas in order of the priority placed on each aspect in their school. The average ranking for each aspect assigned by all principals who responded to this question are shown in Tables 4.14 and 4.15. Reading, writing and maths were placed in the top three at both year levels. Physical education ranked 7th and 8th for Year 4 and Year 8 respectively, and health ranked 11th and 12th respectively.

Table 4.14 Priority ranking of 17 aspects of learning areas by principals at Year 4

Rank	Aspect	N	Minimum	Maximum	Mean
1	Reading	79	1	5	1.7
2	Writing	78	1	6	1.7
3	Mathematics and statistics	79	1	11	2.1
4	Speaking	76	1	15	4.7
5	Listening	75	1	16	5.6
6	Presenting	73	1	17	7.5
7	PE	75	3	15	8.1
8	Science	76	1	16	8.1
9	Viewing	73	1	17	8.3
10	Social Studies	75	3	16	9.2
11	Health	75	1	16	9.9
12	Technology	76	1	17	10.3
13	Visual Arts	73	4	15	10.4
14	Music	74	2	17	10.6
15	Drama	75	4	17	12.7
16	Dance	75	4	17	13.1
17	Language	72	4	17	14.6

Table 4.15 Priority ranking of 17 aspects of learning areas by principals at Year 8

Rank	Aspect	N	Minimum	Maximum	Mean
1	Writing	69	1	7	1.5
2	Reading	67	1	13	1.9
3	Mathematics and statistics	71	1	7	2.2
4	Speaking	67	1	16	5.4
5	Listening	68	1	16	5.9
6	Presenting	68	1	16	6.6
7	Science	70	1	16	6.9
8	PE	70	1	15	7.7
9	Viewing	67	1	17	7.8
10	Social Studies	69	1	17	8.5
11	Technology	70	2	17	8.9
12	Health	68	3	17	9.7
13	Visual Arts	66	3	17	10.4
14	Music	67	1	16	10.8
15	Drama	66	2	17	12.1
16	Dance	68	3	17	12.5
17	Language	67	3	17	12.8

Figure 4.27 shows the involvement of a range of groups in setting a school’s curriculum priorities. It displays the percentages of principals who reported involving their syndicate or curriculum committee, Board of Trustees, community, students, community or cultural experts in their curriculum planning. Principals were able to select multiple responses and so totals do not sum to 100 percent. Almost 25 percent of principals indicated that they involved others: most often these included the syndicate/curriculum committee, the Board of Trustees and slightly less often, the community and students.

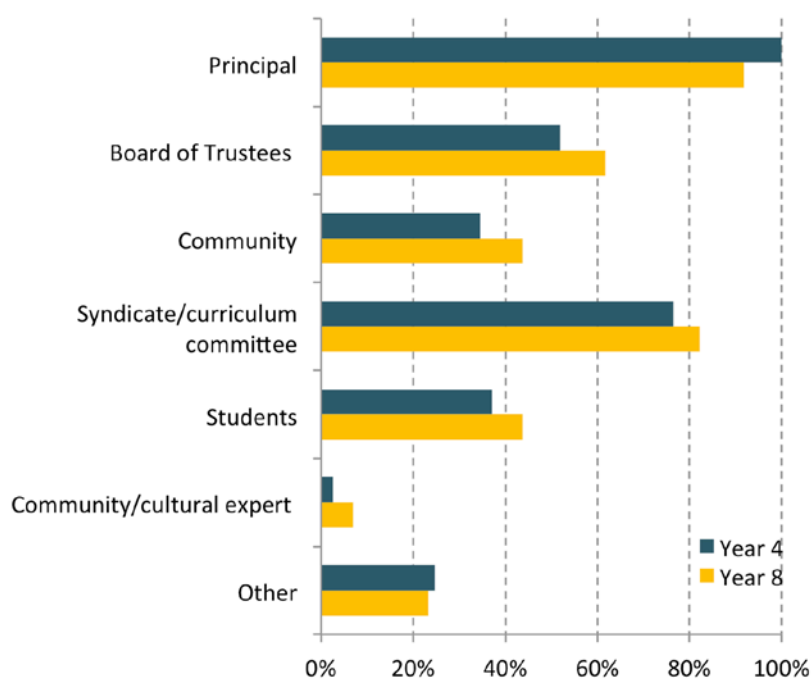


Figure 4.27 Principals reports of groups involved in setting curriculum priorities

## The relationship between curriculum priority and student achievement

The relationship between a school's priority ranking for health and physical education and student achievement on the measure of Critical Thinking in Health and Physical Education was examined. At Year 4, achievement was negatively correlated with a higher priority ranking for health ( $r = -.23$ ;  $p < .000$ ) and for physical education ( $r = -.20$ ;  $p < .000$ ). At Year 8, there was no statistically significant correlation between either health or physical education and student achievement. Examination of the decile profile of high and low priority groups, explored in the following sections, may provide some explanation of these results.

Tables 4.16 and 4.17 display the average achievement scores for Critical Thinking in Health and Physical Education for Year 4 and Year 8 students according to the priority ranking reported by their school principal for health and physical education respectively. A high ranking group included students from schools where the learning areas aspects i.e. (health or physical education) was ranked in the first 5 learning areas, a middle group where it ranked 6th to 12th, and a low ranking group where the learning area aspect was ranked at 13th priority or lower. The results show that for both health and physical education, students at Year 4 schools where health or physical education was a high priority scored, on average, lower than students at those schools where health or physical education was a mid or low priority. There was no significant difference in achievement at Year 8 between students from schools that ranked health or physical education as a high or low priority.

Table 4.16 Year 4 and Year 8 student achievement by health priority ranking by school

Curriculum Priority/ranking	Year 4			Year 8		
	High (1-5)	Middle (6-12)	Low (13-17)	High (1-5)	Middle (6-12)	Low (13-17)
Average Critical Thinking in Health and PE score (scale score units)	73	89	93	112	111	113
N	54	364	161	76	334	114

Table 4.17 Year 4 and Year 8 student achievement by PE priority ranking by school

Curriculum Priority/ranking	Year 4			Year 8		
	High (1-5)	Middle (6-12)	Low (13-17)	High (1-5)	Middle (6-12)	Low (13-17)
Average (scale score units)	81	90	93	111	111	108
N	113	419	47	162	331	47

Exploration of the decile ranking of schools in the high and low health and physical education priority groups may provide some explanation for the above results. Figures 4.28 and 4.29 present the breakdown of Year 4 and Year 8 students by high, middle and low priority groups for health and physical education respectively, and display the percent of students by school decile in each priority group.

At Year 4, the group of students whose schools ranked health or physical education as a high priority contained greater proportions of students from low decile schools than mid or high decile schools. Conversely, the group of students whose schools ranked health as a low priority was made up of a greater proportion of high and mid decile school students. This pattern was more pronounced for physical education: there were no students from low decile schools in the low priority group. NMSSA results for Critical Thinking in Health and Physical Education, described in Chapter 3, have shown that achievement differences by school decile group are significant, with higher achievement by high decile school groups.

At Year 8, the priority rankings assigned to health by schools were more similar across the decile groups than at Year 4. Assigning a higher priority to health did not result in higher achievement on average, for students at Year 8. In physical education, although the priorities were more similar by decile group at Year 8, very few

high decile schools ranked physical education as a high or a low priority. Students in the low priority physical education group came mainly from low and mid decile schools and scored slightly lower on average than the other two priority groups. The difference in average scores may be due to the difference in composition by school decile.

There was a tendency at Year 4, amongst the low decile schools in this sample, to place a higher priority on health and physical education than was the case among high decile schools. Generally, the reasons for these differences in priority for health and physical education by decile group and their implications for achievement across the learning areas deserve further consideration, but are possibly related to current Ministry of Education curriculum priorities for raising achievement in reading, writing and mathematics across the curriculum.

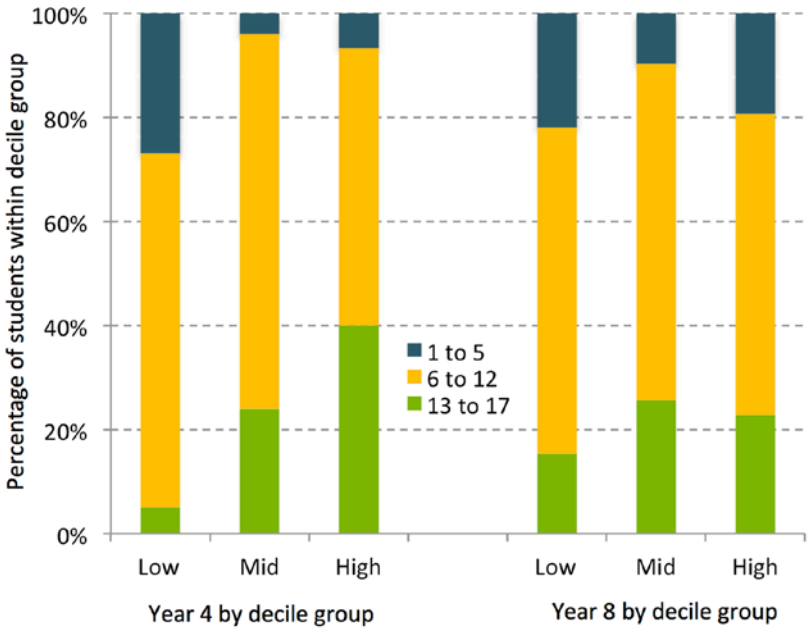


Figure 4.28 Year 4 and Year 8: Percentage of students in each decile group by health priority ranking

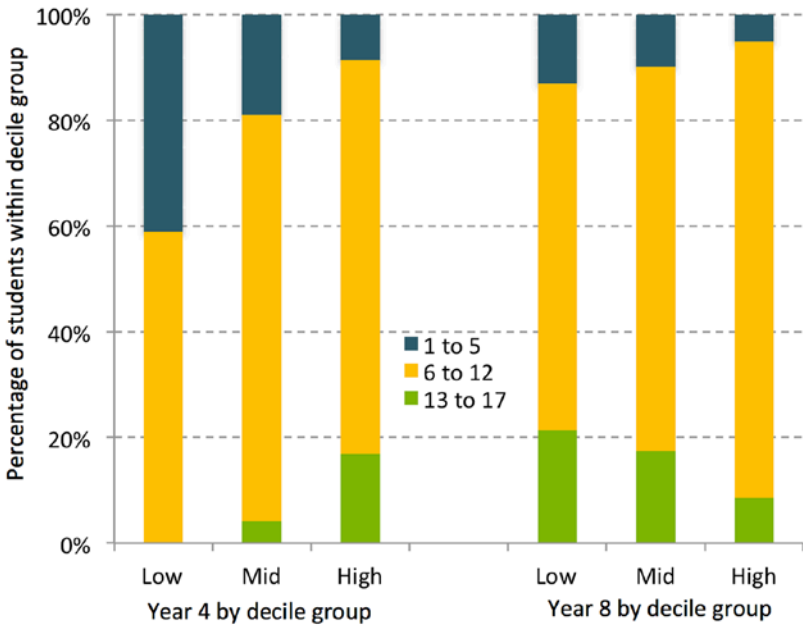


Figure 4.29 Year 4 and Year 8: Percentage of students in each decile group by PE priority ranking

# 5 Māori Student Achievement in Health and Physical Education

This chapter presents the findings for Māori<sup>18</sup> student achievement in health and physical education (PE) at Year 4 and Year 8. It looks at the variation of achievement within year levels and presents results against the levels of the NZC. It examines the difference in achievement between Year 4 and Year 8, and differences between sub-groups of gender, school decile and type of school. The chapter presents a profile of Māori students who scored above the benchmark of the national average at Year 4 and Year 8 with respect to gender, school decile, attitudes and opportunities to learn health and physical education. It also provides information on Māori students' understanding of well-being, demonstration of movement skills, and frequency of physical activity outside of school.

In this chapter, we compare the Māori student sub-group to all students in the national sample. When making these comparisons the national sample will be referred to as 'All Students'.

For some of the tables used in this chapter, particularly those associated with population sub-groups, fuller tables of averages, standard deviations, sample sizes, effect sizes, and 95 percent confidence intervals can be found in Appendix 4.

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<sup>18</sup> Students could identify with up to three ethnic groups. All students who identified as Māori were included in these analyses



## Success and achievement of Māori students in health and physical education – An overview

### Achievement in health and physical education

Generally Year 4 and Year 8 Māori students achieved at a lower level than NZ European students. However, many features of Māori student achievement followed similar patterns to the national samples.

The average achievement in Critical Thinking in Health and Physical Education was lower for Māori students from low decile schools but similar for Māori boys and girls, and for Māori students attending different types of schools. This was similar to the finding for the All Students group.

Māori students made similar progress between Year 4 and Year 8 as All Students.

The majority of Māori and NZ European students described well-being categorised as mental/emotional (taha hinengaro), social (taha whānau) and physical (taha tinana) dimensions of well-being. Understanding of well-being increased from Year 4 to Year 8 with the greatest differences being for the mental/emotional and social dimensions for Māori students. At both year levels very few students mentioned the spiritual (taha wairua) dimension of well-being.

Māori students' movement skills developed considerably from Year 4 to Year 8 showing a similar increase for All Students. At each year level, slightly more boys performed higher than girls on movement skills, and strategic action skills, but there were no gender differences on the movement sequences task.

### Achievement against curriculum levels

Students' performance on the Critical Thinking for Health and Physical Education measure was aligned to the curriculum levels in health and physical education. Ninety-four percent of Year 4 Māori students were achieving at Level 2 or above. This was similar to All Students and exceeds the expectations expressed in the NZC for health and physical education for Year 4 students. Forty-one percent of the Year 8 Māori students were achieving at Level 4 or above. This was lower than the proportion of All Students at Year 8 achieving at that level. Overall Year 8 students were achieving below curriculum expectations.

### Physical activities outside of school

Approximately half of Māori students engaged in physical activities outside of school at Year 4 and Year 8 almost every day with Year 8 Māori students being engaged in physical activities more frequently than Year 4 students. A similar pattern was observed for NZ European students. About half of Year 4 Māori students and slightly more (about 60 percent) of Year 8 Māori students would like to do more physical activities outside of school.

### Benchmarking Māori success

The national averages at Year 4 and Year 8 were used as the benchmarks for the respective year levels. Approximately 40 percent of Māori students scored above the benchmark on the Critical Thinking in Health and Physical Education measure at Year 4 and Year 8. The characteristics of Māori students at each year level who scored above the benchmark for their year level were explored and contrasted with a similarly sized group of students who scored below the benchmark.

Māori students in the above benchmark group at Year 4 reported having more frequent opportunities to take action to improve their health after learning something in class, and at Year 8 students reported more frequent opportunities to learn something in health that was important to them. In general there was little difference in the pattern of responses for students above the benchmark compared with those below the benchmark with respect to opportunities to learn physical education.

### The interaction between decile and ethnicity

At each year level, a greater proportion of Māori students at high decile schools achieved above the benchmark than Māori students from mid and low decile schools. A study of how decile and ethnicity related to achievement in Critical Thinking in Health and Physical Education indicated that decile is strongly associated with achievement on this scale. Average health and physical education scores increased with decile. In addition, there was an effect due to ethnicity which remained after accounting for the decile effect.

## 1. Year 4 Māori student achievement in health and physical education

Table 5.1 shows how Māori students in Year 4 performed on the NMSSA Critical Thinking in Health and Physical Education scale. It provides the average scale score along with standard deviation and sample size.

Table 5.1 Year 4 Māori student overall achievement in Critical Thinking in Health and PE

	Critical Thinking in Health and PE
Average (scale score units)	83
SD (scale score units)	20
N	162

At Year 4 the average score for Māori students on the health and physical education measure was 83 scale score units. This was lower than that for All Students (89 scale score units) with the same amount of variation. Refer to Chapter 2 for details of the health and physical education descriptions that identify what Year 4 Māori students know and can do at this level.

A curriculum alignment exercise was undertaken to link performance ranges on the NMSSA health and physical education to the NZC (Appendix 3). Creating this link allowed scale scores for this measure to be reported in terms of curriculum expectations. It should be noted that the scale assesses a subset of the learning objectives covered by the health and physical education learning area. A number of other aspects of the learning area, e.g. understanding of well-being and movement skills were assessed and reported on separately.

Table 5.2 sets out the percentage of Year 4 Māori students who scored in each curriculum level for health and physical education. Ninety-four percent of Year 4 Māori students achieved at Level 2 or above as did All Students. This represents the expected level of performance for Year 4 students at the end of the year and indicates that almost all students are exceeding the curriculum expectations in the domains assessed.

Table 5.2 Percentage of Year 4 Māori students and All Students achieving at the NZC health and PE level 2

	Critical Thinking in Health and PE	
	Māori students (%)	All Students (%)
Level 2 or above	94	97
Not yet Level 2	6	3

## 2. Year 8 Māori student achievement in health and physical education

Table 5.3 shows how Māori students in Year 8 performed on the Critical Thinking in Health and Physical Education scale. The table provides the average scale score, standard deviation and sample size.

Table 5.3 Year 8 Māori student overall achievement in Critical Thinking in Health and PE

	Critical Thinking in Health and PE
Average (scale score units)	108
SD (scale score units)	17
N	188

The average achievement for Year 8 Māori students on the Critical Thinking in Health and Physical Education measure was 108 scale score units. This was lower than that for All Students (111 scale score units) with slightly less variation in the scores. Refer to Chapter 2 for details of the health and physical education descriptions that identify what Year 8 Māori students know and can do at this level.

Table 5.4 shows how Year 8 Māori students performed against the NZC levels on the Critical Thinking in Health and Physical Education measure. Just over 41 percent of Māori students achieved at Level 4 and above compared to just over half of All Students. The Level 4 and above band represents the performance expectation for Year 8 students. Generally, Year 8 students were achieving below the curriculum expectations.

Table 5.4 Percentage of Year 8 Māori students and All Students achieving at the NZC health and PE level 4

	Critical Thinking in Health and PE	
	Māori students (%)	All Students (%)
Level 4 or above	41	51
Not yet Level 4	59	49

### 3. Comparison of Year 4 and Year 8 Māori student achievement

Figure 5.1 shows the distribution of Year 4 and Year 8 Māori students on the Critical Thinking in Health and Physical Education scale. As expected, Year 8 Māori students achieved, on average, higher scores than Year 4 students. As with All Students, there was a wide variation in scores at each year level, and some overlap in the achievement of Year 4 and Year 8 Māori students.

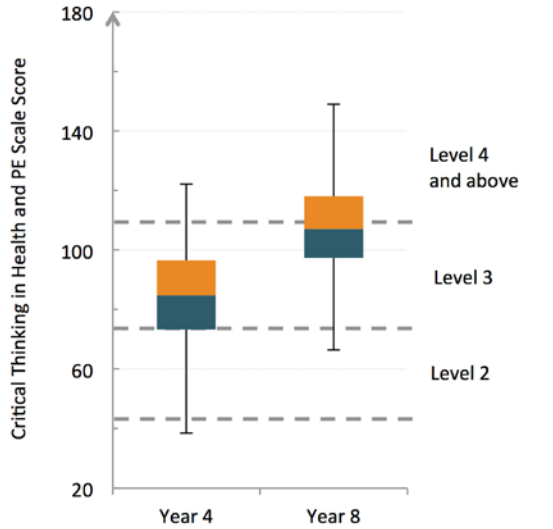


Figure 5.1 Māori student achievement for Critical Thinking in Health and PE by year level

Figures 5.2 and 5.3 illustrate the spread of achievement across the NZC levels for Year 4 and Year 8 Māori students on the Critical Thinking in Health and Physical Education measure. The blurred lines around the cut-off scores dividing the curriculum levels reflect the fact that these boundaries may not be precise.

The figures show that most Year 4 Māori students were achieving at least in the Level 2 performance range or higher and that most of Year 8 Māori students were achieving at Level 3 or above. The proportion of Year 8 Māori students achieving at this level was lower than the proportion of All Students at Year 8 achieving it.

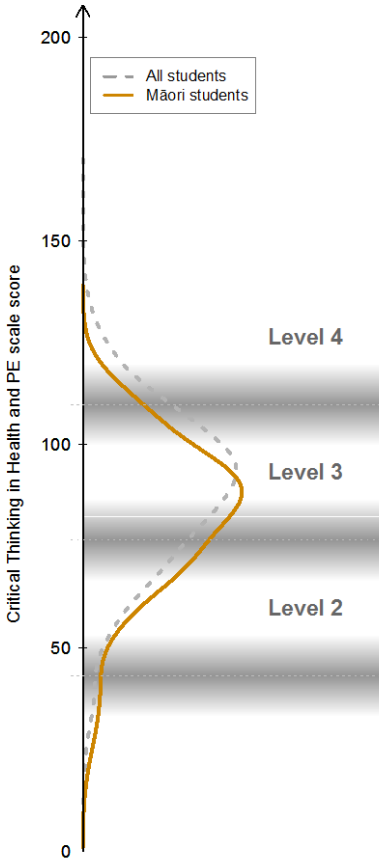


Figure 5.2 Distribution of Year 4 Māori student achievement on Critical Thinking in Health and PE against levels of the NZC health and PE

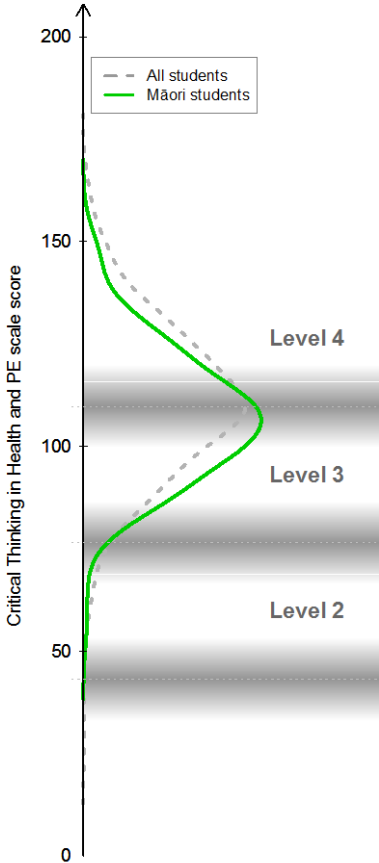


Figure 5.3 Distribution of Year 8 Māori student achievement on Critical Thinking in Health and PE against levels of the NZC health and PE

Table 5.5 shows the differences in average scores between Year 4 and Year 8 Māori students expressed in scale score units and effect sizes, and the average, standard deviation and sample size for each year level for the Critical Thinking in Health and Physical Education scale.

The Māori student average scores were lower than those of All Students at both year levels (See Chapter 3). However, the scale score unit difference (ssud) between the Year 4 and Year 8 average for Māori students was 25 and for All Students it was 23. The respective annual average effect sizes were 0.34 and 0.28. Indicating that Māori students were making at least a similar level of progress as All Students.

Table 5.5 Overall measure of Māori student achievement in Critical Thinking in Health and PE and difference of achievement by year level

	Critical Thinking in Health and PE	
	Year 4	Year 8
Average (scale score units)	83	108
SD (scale score units)	20	17
N	162	188
Year 4/Year 8 difference*	25	
Effect size	<b>1.35</b>	
Annual average effect size	0.34	

\*Difference = Year 8 – Year 4

Effect sizes in bold are statistically significant ( $p < .05$ )

### Sub-group comparisons

Figures 5.4 and 5.5 display the level and spread of scores for Critical Thinking in Health and Physical Education for Year 4 and Year 8 students respectively according to gender, school decile<sup>19</sup>, and type of school<sup>20</sup>. There is a pattern of increasing average scores for Māori students at both year levels attending low, mid and high decile schools, and no significant gender differences in terms of average score. Year 4 Māori students attending full primary and contributing schools performed at similar levels and on average higher than those attending composite schools. At Year 8, Māori students attending full primary and intermediate schools performed at similar levels, although the spread of scores was much greater for those attending intermediate schools. The number of students that participated in assessments within each sub-group is provided in Appendix 4.

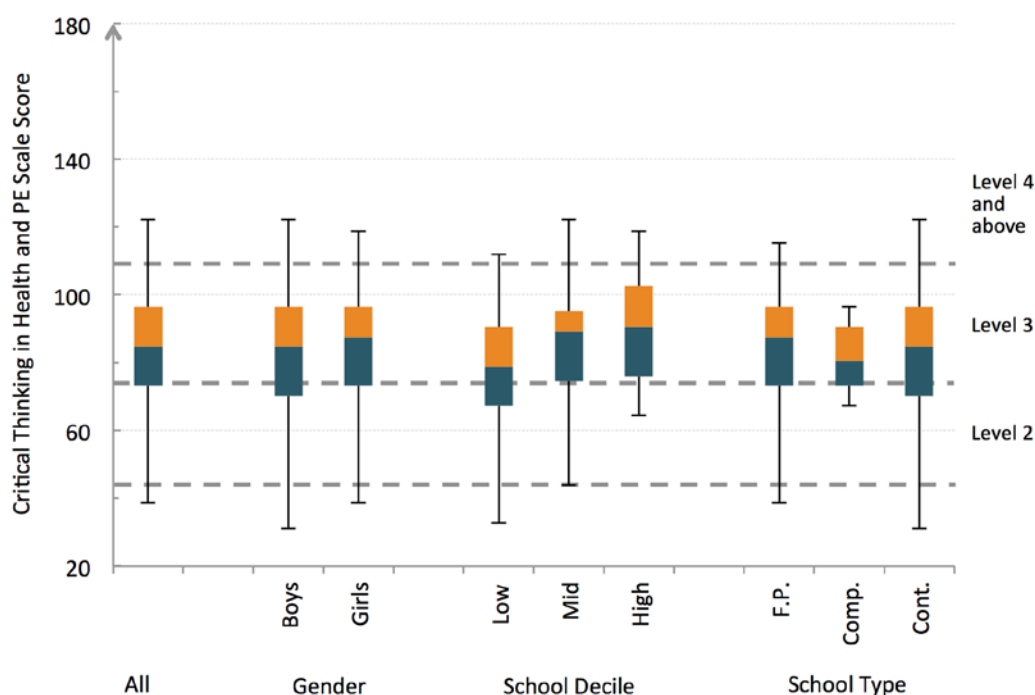


Figure 5.4 Year 4 Māori student score distribution for Critical Thinking in Health and PE by gender, school decile and school type (F.P.=Full Primary, Comp.=Composite, Cont.=Contributing)

<sup>19</sup> Low decile schools (1-3); Mid decile schools (4-7); High decile schools (8-10) (<http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/SchoolOperations/Resourcing/OperationalFunding/Deciles.aspx>)

<sup>20</sup> Full Primary (Year 1 – 8); Contributing (Year 1 – 6); Intermediate (Year 7 – 8); Composite (Year 1-13); Secondary (Year 7-13)

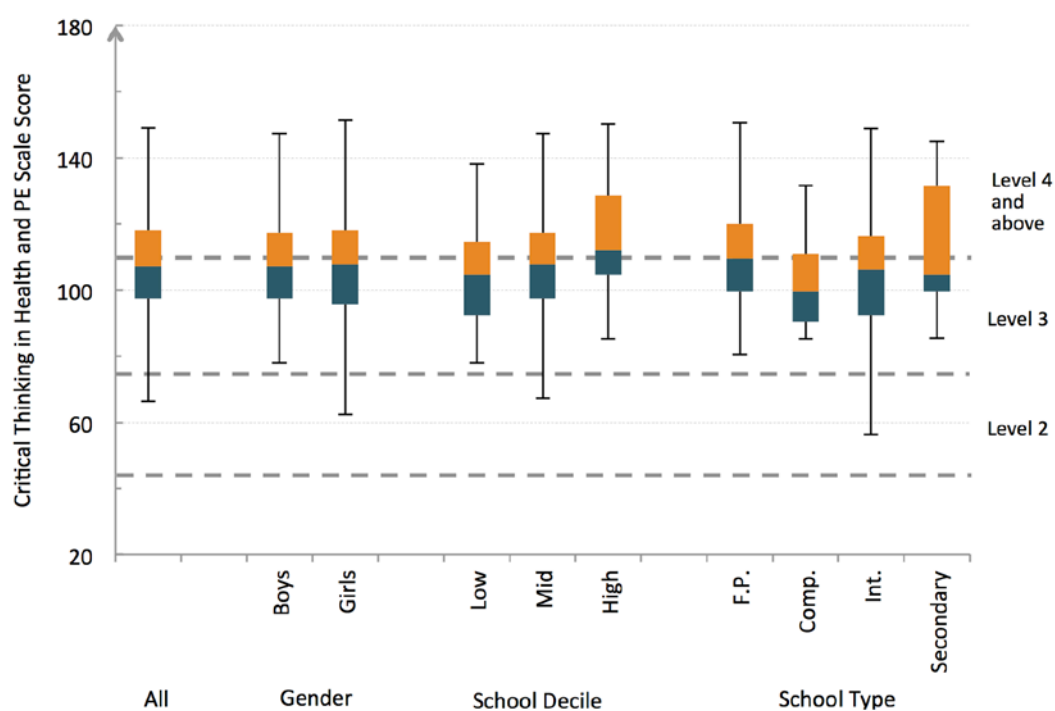


Figure 5.5 Year 8 Māori student score distribution for Critical Thinking in Health and PE by gender, school decile and school type (F.P.=Full Primary, Comp.=Composite, Int.=Intermediate)

Table 5.6 sets out the average scale score differences between sub-groups and the corresponding effect sizes these represent at Year 4 and Year 8. The sub-group analysis shows that, on average, Māori students at Year 4 from high and mid decile schools achieved significantly higher than those from low decile schools. The scale score unit differences were 9 and 14 (with corresponding effect sizes of (-0.44 and -0.68)). There was no statistically significant difference between mid and high decile schools. At Year 8, statistically significant differences were found between students in high and low decile schools only. The ssud was 9 with an effect size of -.80. There were no gender or school type differences at either year level.

Table 5.6 Year 4 and Year 8 Māori students: Sub-group differences on Critical Thinking in Health and PE

	Critical Thinking in Health and PE			
	Year 4		Year 8	
	Difference (scale score units)	Effect Size	Difference (scale score units)	Effect Size
<b>Gender</b>				
Boys/Girls	-2	-0.09	1	0.03
<b>School Decile</b>				
Low/Mid	-9	<b>-0.44</b>	-3	-0.21
Mid/High	-5	-0.29	-9	-0.51
Low/High	-14	<b>-0.68</b>	-12	<b>-0.80</b>
<b>School Type</b>				
Full Primary/Contributing	0	0.02	-	-
Full Primary/Intermediate	-	-	6	0.33
Intermediate/Secondary	-	-	-8	-0.44
Full Primary/Secondary	-	-	-2	-0.13

Effect sizes in bold are statistically significant ( $p < .05$ ) N for Secondary = 13

The scale score differences have been calculated using non-rounded numbers, and are numerically correct. In some cases the scale score difference may not be the same as the simple difference in the pair of averages reported in the table.

Table 5.7 compares the differences between Year 4 and Year 8 Māori students for each sub-group. The difference between scale score units ranged from 21 to 27 with an average annual effect size for each group over 0.30. For All Students the difference between scale score units ranged from 21 to 25 with an average annual effect size of 0.28. Thus Māori students' progress for all sub-groups was similar to that for All Students.

Table 5.7 Differences in Critical Thinking in Health and Physical Education measure between Year 4 and Year 8 Māori students by sub-group

	Critical Thinking in Health and PE				
	Year 4 average (scale score units)	Year 8 average (scale score units)	Difference* (scale score units)	Effect Size	Average Annual Effect Size
<b>Gender</b>					
Boys	82	108	26	<b>1.42</b>	0.35
Girls	84	107	24	<b>1.27</b>	0.32
<b>School Decile</b>					
Low	77	104	27	<b>1.46</b>	0.36
Mid	86	108	21	<b>1.22</b>	0.31
High	91	117	26	<b>1.54</b>	0.38

Difference = Year 8 – Year 4.

Effect sizes in bold are statistically significant ( $p < .05$ )

The scale score differences have been calculated using non-rounded numbers, and are numerically correct. In some cases the scale score difference may not be the same as the simple difference in the pair of averages reported in the table..

#### 4. Māori students' understanding of well-being, movement skills and reported physical activity

##### Well-being

As explained in Chapter 3 the NZC identifies the concept of Hauora as being at the heart of learning in health and physical education. Hauora is defined as a Māori philosophy of well-being that includes four dimensions: spiritual (taha wairua), mental/emotional (taha hinengaro), social (taha whānau) and physical (taha tinana). Students were told there are lots of different kinds of things that people do or have in their life to help them feel well or happy. They were asked to draw pictures or write words to show the things that people do or have to help keep them well or happy. They discussed the pictures with an interviewer. Interviews were analysed and elements of well-being identified were categorised into the different dimensions of well-being. Note that percentage frequencies reported in tables in this section may not always sum to 100 percent due to rounding.

Table 5.8 displays the percentage of Māori students at Year 4 and Year 8 whose responses were categorised into each of the four dimensions of well-being, alongside those for NZ European students. See Table 3.20, Chapter 3 for the examples of how student responses were categorised.

Table 5.8 Percentage of Māori and NZ European students identifying dimensions of Well-being by year level

	Year 4		Year 8	
	Māori (%) N = 162	NZE (%) N = 481	Māori (%) N = 190	NZE (%) N = 457
Physical	63	63	72	72
Mental/Emotional	78	85	93	93
Social	70	71	85	86
Spiritual	7	4	16	13

Māori and NZ European students responded similarly on all but two dimensions. At Year 4, a slightly smaller proportion of Māori students mentioned the mental/emotional dimension than NZ Europeans (78 percent compared to 85 percent). At both year levels very few students' responses related to the spiritual dimension of well-being, although there was a slightly higher proportion of Māori students than All Students.

Overall more Year 8 students' than Year 4 students' descriptions of well-being related to each dimension of well-being with the greatest differences being for the mental/emotional and social dimensions.

## Movement skills

The following tables display the percentage of Māori students by gender who scored in the different ranges of movement skills on three tasks: Rippa Tag (Table 5.9 and 5.10), Rua Tapawhā (Table 5.11 and 5.12), and Movement Sequences (Table 5.13 and 5.14). Refer to Chapter 3 for the description of the tasks and skills assessed, the scoring guide for each task and the findings for All Students.

Year 4 Māori students generally demonstrated low to mid range skills in movement skills, and strategic action skills. However, they demonstrated mid to high level movement sequences skills. Year 8 Māori students generally demonstrated mid to high range skills in all areas, and mid-high to high movement sequences skills. At both year levels slightly more boys than girls demonstrated higher levels of movement skills and strategic action skills. Students at both year levels showed stronger skills (mid-high to high range) in movement sequences with no difference between boys and girls. The pattern of responses was similar to that for All Students on the three movement skill tasks.

Table 5.9 Māori Year 4 Movement skills: Percentage of students scoring at each level for 'Rippa Tag' activity by year and gender

	Māori students		
	All (%)	Boys (%)	Girls (%)
Student displays all/almost all aspects from high range movement list	9	11	6
Student displays a variety of aspects – mainly mid range with some high range movements	31	39	22
Student displays a few aspects from mid range with some low range movements	46	46	45
Student displays low range movements	14	3	26

Table 5.10 Māori Year 8 Movement skills: Percentage of students scoring at each level for 'Rippa Tag' activity by year and gender

	Māori students		
	All (%)	Boys (%)	Girls (%)
Student displays all/almost all aspects from high range movement list	16	22	10
Student displays a variety of aspects – mainly mid range with some high range movements	47	43	52
Student displays a few aspects from mid range with some low range movements	24	23	24
Student displays low range movements	13	12	13

Table 5.11 Māori Year 4 Strategic action skills: Percentage of students scoring at each level for 'Rua Tapawhā' activity by year and gender

	Māori students		
	All (%)	Boys (%)	Girls (%)
Student displays all/almost all aspects from high range movement list	5	5	5
Student displays a variety of aspects – mainly mid range with some high range movements	40	46	32
Student displays a few aspects from mid range with some low range movements	46	44	49
Student displays low range movements	9	6	13



Table 5.12 Māori Year 8 Strategic action skills: Percentage of students scoring at each level for 'Rua Tapawhā' activity by year and gender

	Māori students		
	All (%)	Boys (%)	Girls (%)
Student displays all/almost all aspects from high range movement list	26	35	16
Student displays a variety of aspects – mainly mid range with some high range movements	49	47	52
Student displays a few aspects from mid range with some low range movements	15	10	22
Student displays low range movements	9	9	10

Table 5.13 Māori Year 4 Movement sequence skills: Percentage of students scoring at each level for 'Movement Sequences' activity by year and gender

	Māori students		
	All (%)	Boys (%)	Girls (%)
High range: Includes 4 or more elements, 3 aspects of consistency, and 3 aspects of cooperative work	40	36	44
Mid-high range: Includes 2-3 elements, 2 aspects of consistency, and 2 aspects of cooperative work	48	48	48
Low-mid range: Includes at least 3 movements/1 element, 1 aspect of consistency, and 1 aspect of cooperative work	12	15	8
Low range: No response/don't know, does not complete 3 movements, no evidence of consistency, and no evidence of cooperative work	1	1	0

Table 5.14 Māori Year 8 Movement sequence skills: Percentage of students scoring at each level for 'Movement Sequences' activity by year and gender

	Māori students		
	All (%)	Boys (%)	Girls (%)
High range: Includes 4 or more elements, 3 aspects of consistency, and 3 aspects of cooperative work	47	46	49
Mid-high range: Includes 2-3 elements, 2 aspects of consistency, and 2 aspects of cooperative work	45	48	42
Low-mid range: Includes at least 3 movements/1 element, 1 aspect of consistency, and 1 aspect of cooperative work	7	7	8
Low range: No response/don't know, does not complete 3 movements, no evidence of consistency, and no evidence of cooperative work	1	0	1

## Physical activity

Table 5.15 shows the percentage of Māori students engaging in physical activities outside of school at Year 4 and Year 8. Approximately half of students at each year level were involved in physical activities every day. Generally, Year 8 Māori students were engaged in physical activities more frequently than Year 4 students.

Table 5.15 Percentage of students reporting different frequency of physical activity outside of school by year level and ethnicity

	Year 4		Year 8	
	Māori (%) N = 159	NZE (%) N = 479	Māori (%) N = 189	NZE (%) N = 453
Nearly every day	48	50	50	57
2-3 times a week	27	35	39	34
About once a week	18	10	7	5
Hardly ever	8	4	4	3

When asked whether they would like to do more, less or about the same level of physical activity (Table 5.16) just over half of Year 4 Māori students and a greater percentage (60 percent) of Year 8 Māori students said they would like to do more.

Table 5.16 Percentage of students reporting their desired level of physical activity by year level and ethnicity

	Year 4		Year 8	
	Māori (%) N = 161	NZE (%) N = 480	Māori (%) N = 189	NZE (%) N = 456
More	51	55	60	53
About the same	47	43	38	46
Less	2	1	2	1

The number of Māori students who identified different types of barriers to greater physical activity was too small to accurately report on. However, it should be noted that the small number of Māori students who identified barriers at Year 4 were focused on health, being busy with other things and family circumstances. At Year 8 a greater number of students were able to identify barriers and these were predominantly being busy with other things and health issues, with a minority identifying family circumstances and access barriers.

## 5. Benchmarking Māori success

This section contrasts the profiles of Year 4 and Year 8 Māori students who scored above the national average at their year level. They are compared with the students from the national sample who also scored above the national averages for Year 4 and Year 8 respectively. The 2013 national averages serve as benchmark scores with which to compare health and physical education results for different groups this year. These benchmarks may also be used to compare health and physical education results across future cycles of NMSSA health and physical education.

Table 5.17 shows the number (and percentage) of Year 4 and Year 8 Māori students who scored above the benchmark for their year level, along with the average level and spread of their scores on the Critical Thinking in Health and Physical Education achievement measure. The difference between the percentage of Māori and All Students reaching the respective benchmarks was similar at Year 4 and Year 8. At Year 4, 41 percent of Māori students scored above the benchmark compared with 53 percent of All Students and at Year 8, the corresponding figures were 39 percent compared with 50 percent. At both year levels the average score for Māori students was three scale units lower than for all students (effect size of approximately 0.2).

Table 5.17 Year 4 and Year 8: Summary statistics for students scoring above the benchmarks for their year

	Critical Thinking in Health and PE			
	Year 4 students scoring above the national Year 4 average		Year 8 students scoring above the national Year 8 average	
	Māori students	All students	Māori students	All students
Number above benchmark (of total group)	66 (162)	410 (776)	73 (188)	381 (762)
Percentage of respective group (%)	41	53	39	50
Average (scale score units)	101	104	124	127
SD (scale score units)	8	11	11	12

Figures 5.6 and 5.7 contrast the group of Māori students who achieved above the benchmark with the group of All Students who scored above the benchmark at Year 4 and Year 8 respectively in relation to gender and attitudes to health and physical education. At both year levels, Māori and All Students scoring above the benchmark showed broadly similar patterns with respect to gender and Attitudes to Health and Physical Education. There was no clear pattern relating health and physical education achievement with Attitude to Health or Attitude to Physical Education for students who achieved above the benchmark.

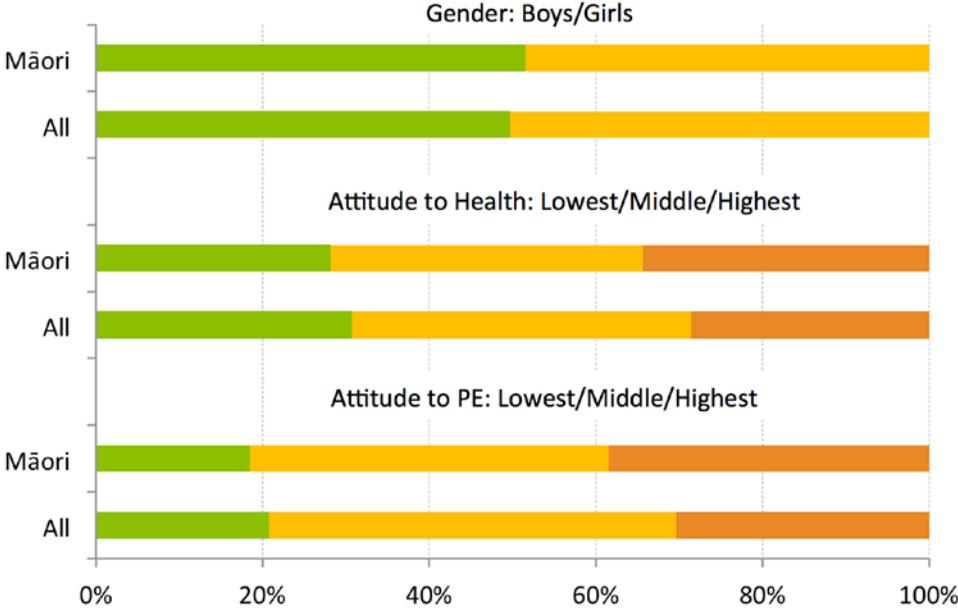


Figure 5.6 Year 4: Percent of Māori students and all students scoring above the benchmark on Critical Thinking in Health and PE by gender and Attitude to Health and PE

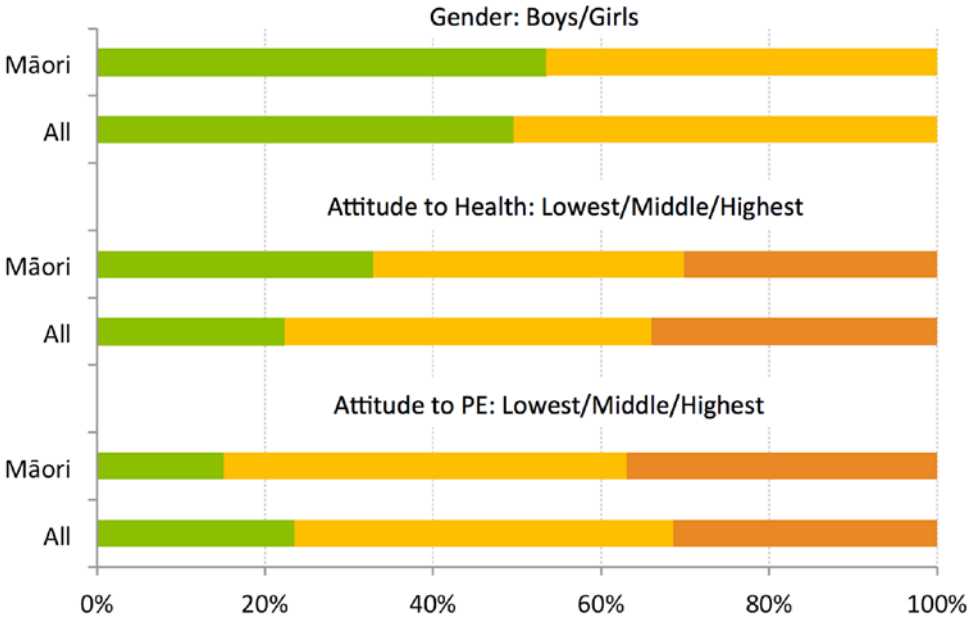


Figure 5.7 Year 8: Percent of Māori students and all students scoring above the benchmark on Critical Thinking in Health and PE by gender and Attitude to Health and PE

## Māori students and opportunities to learn health and physical education

When a particular group is achieving at a high level, it is informative to try to determine factors that are associated with the groups success, which are not present for the less successful group.

This section compares Māori students who scored above the benchmark to an equivalent sized group of Māori students who gained the lowest scores on the Critical Thinking in Health and Physical Education scale with respect to opportunities to learn health and physical education. To make comparisons easily, the two low frequency categories – ‘Not at all’ and ‘A little’ were combined, and compared with the two high frequency categories - ‘Quite a lot’ and ‘Heaps’.

Tables 5.18 to 5.21 compare statements from the opportunities to learn in health and physical education reported by students who achieved above the benchmark and by students who scored below.

Māori students in the above benchmark group at Year 4 reported having more frequent opportunities to take action to improve their health after learning something in class, and at Year 8 students reported more frequent opportunities to learn something in health that was important to them. In general there was little difference in the pattern of responses for students above the benchmark compared with those below the benchmark with respect to opportunities to learn physical education.

Table 5.18 Year 4 Māori students: Opportunities to learn health by above benchmark and low achievement groups on Critical Thinking in Health and PE

How often do you have these opportunities?	Year 4 Māori students scoring above benchmark (N=66)		Comparison group of Year 4 Māori students with lowest achievement (N=66)	
	Not at all/ A little (%)	Quite a lot/ Heaps (%)	Not at all/ A little (%)	Quite a lot/ Heaps (%)
Work in groups to think about and discuss things in health	52	48	46	54
Learn something in health that is important to me	34	66	29	71
Take action to improve my health after learning something in class	22	78	39	61
Share things I've learned about health with others	48	52	40	60
My whole class does things that help me learn about health	57	43	38	62

Table 5.19 Year 8 Māori students: Opportunities to learn health by above benchmark and low achievement groups on Critical Thinking in Health and PE

How often do you have these opportunities?	Year 8 Māori students scoring above benchmark (N=73)		Comparison group of Year 8 Māori students with lowest achievement (N=73)	
	Not at all/ A little (%)	Quite a lot/ Heaps (%)	Not at all/ A little (%)	Quite a lot/ Heaps (%)
Work in groups to think about and discuss things in health	58	42	53	47
Learn something in health that is important to me	33	67	50	50
Take action to improve my health after learning something in class	44	56	46	54
Share things I've learned about health with others	67	33	61	39
My whole class does things that help me learn about health	67	33	66	34

Table 5.20 Year 4 Māori students: Opportunities to learn PE by above benchmark and low achievement groups on Critical Thinking in Health and PE

	Year 4 Māori students scoring above benchmark (N=66)		Comparison group of Year 4 Māori students with lowest achievement (N=66)	
	Not at all/ A little (%)	Quite a lot/ Heaps (%)	Not at all/ A little (%)	Quite a lot/ Heaps (%)
Use equipment to play and move around	17	83	17	83
Have challenges like making up movement patterns or solving problems	32	68	27	73
Work in teams or groups	22	78	15	85
Learn about playing fair	11	89	22	78
Learn how to be safe when I am moving in different ways	15	85	21	79
Learn new skills and different ways of moving	14	86	18	82

Table 5.21 Year 8 Māori students: Opportunities to learn PE by above benchmark and low achievement groups on Critical Thinking in Health and PE

	Year 8 Māori students scoring above benchmark (N=73)		Comparison group of Year 8 Māori students with lowest achievement (N=73)	
	Not at all/ A little (%)	Quite a lot/ Heaps (%)	Not at all/ A little (%)	Quite a lot/ Heaps (%)
Use equipment to play and move around	18	82	22	78
Have challenges like making up movement patterns or solving problems	49	51	41	59
Work in teams or groups	7	93	8	92
Learn about playing fair	19	81	22	78
Learn how to be safe when I am moving in different ways	26	74	31	69
Learn new skills and different ways of moving	18	82	24	76

### Māori student achievement by school decile

Tables 5.22 and 5.23 show the total number of Year 4 Māori and NZ European students respectively, assessed in health and physical education and the number of students who achieved above the benchmark for their year, broken down by school decile. Tables 5.24 and 5.25 show the corresponding results for Year 8 students.

Eighty-one percent of Year 4 Māori students and 86 percent of Year 8 Māori students came from low and mid decile schools. This contrasts with 49 and 59 percent of Year 4 and Year 8 NZ European students attending low and mid decile schools. By number, the group of Māori students from mid decile schools who scored above the benchmark is the largest. However, a greater proportion of Māori students at mid and high decile schools (about 50 percent) achieved above the benchmark than from low decile schools (29 percent). This was a similar pattern to achievement by decile for the national sample (see Chapter 3). For example, 19 percent of all Year 4 Māori students attended a high decile school and 52 percent of those scored above the benchmark. In contrast, 46 percent of Māori students attended a low decile school, but only 29 percent of those achieved above the benchmark.

Table 5.22 Year 4: Number and percentage of Māori students by school decile who participated in Critical Thinking in Health and PE and achieved above the benchmark

School Decile	All Māori Students		Māori students who achieved above the national average as a percentage of all Māori in that decile group	
	N	%	N	%
Low	75	46	22	29
Mid	56	35	28	50
High	31	19	16	52
<b>Total</b>	<b>162</b>	<b>100</b>	<b>66</b>	<b>-</b>

Table 5.23 Year 4: Number and percentage of NZ European students by school decile who participated in Critical Thinking in Health and PE and achieved above the benchmark

School Decile	NZ European		NZ European students who achieved above the national average as a percentage of all NZ European in that decile group	
	N	%	N	%
Low	48	10	22	46
Mid	186	39	118	63
High	249	52	164	66
<b>Total</b>	<b>483</b>	<b>100</b>	<b>304</b>	<b>-</b>

Table 5.24 Year 8: Number and percentage of Māori students by school decile who participated in Critical Thinking in Health and PE and achieved above the benchmark

School Decile	All Māori Students		Māori students who achieved above the national average as a percentage of all Māori in that decile group	
	N	%	N	%
Low	66	35	20	30
Mid	95	51	38	40
High	27	14	15	56
<b>Total</b>	<b>188</b>	<b>100</b>	<b>73</b>	<b>-</b>

Table 5.25 Year 8: Number and percentage of NZ European students by school decile who participated in Critical Thinking in Health and PE and achieved above the benchmark

School Decile	NZ European		NZ European students who achieved above the national average as a percentage of all NZ European in that decile group	
	N	%	N	%
Low	32	7	19	59
Mid	236	52	126	53
High	187	41	125	67
<b>Total</b>	<b>455</b>	<b>100</b>	<b>270</b>	<b>-</b>

## The interaction between decile and ethnicity

Reporting on differences between groups of students in New Zealand by ethnicity is a complex matter. Analysis is complicated on two counts. First, as already reported, ethnic groups (Māori and NZ European) are disproportionately represented across deciles, with a high proportion of Māori students and a small proportion of NZ European students attending lower decile schools. Secondly, students may identify with more than one ethnic group. It is difficult to make robust statistical statements about these two groups when there is substantial ‘blurring’ with regard to group membership.

To attempt to extrapolate an accurate picture, the health and physical education dataset for this analysis has been reduced to those who identify with Māori, NZ European, or both ethnic groups, and decile has been grouped by quintile<sup>21</sup>.

For each year level separately, models were run to examine effects on performance on the Critical Thinking in Health and Physical Education scale due to quintile and ethnicity. The models showed that there was an effect due to ethnicity which remained after accounting for the quintile effect at both year levels. That is, there is a difference in average critical thinking scores between Māori and NZ European students over and above the difference accounted for by quintile. This difference is constant (as far as the model can determine) across all quintiles.

At Year 4 there is a difference of 9 scale score units on average between Māori and NZ European performance on the Critical Thinking in Health and Physical Education scale after quintile has been taken into account. This equates to an effect size of about 0.4. At Year 8, the equivalent difference is slightly smaller - about 7 scale score units, with Māori students scoring lower than NZ European on average - an effect size of about 0.3.

These results should be interpreted with caution. The model's ability to precisely assess how Māori students are performing in higher decile schools (and how NZ European students are performing in lower decile schools) is compromised by the disproportionate numbers of students in those deciles with respect to their ethnicity. Details of this analysis can be found in Appendix 5 along with graphics giving an overall representation of the results. The graphics display important information about the distribution of ethnic groups across quintiles, and the variability of scores within quintile.

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<sup>21</sup> Decile 1-2 → Quintile 1, Decile 3-4 → Quintile 2, ... , Decile 9-10 → Quintile 5

# 6 Pasifika Student Achievement in Health and Physical Education

This chapter presents the findings for Pasifika<sup>22</sup> student achievement in health and physical education (PE) at Year 4 and Year 8. It looks at achievement within year levels and presents it against the levels of the NZC health and physical education. It examines the difference in achievement between Year 4 and Year 8, and differences among sub-groups of gender, school decile, and type of school. The chapter presents a profile of Pasifika students who scored above the national average at Year 4 and Year 8 with respect to gender, school decile, attitudes and opportunities to learn health and physical education. It also provides information on Pasifika students' understanding of well-being, movement skills, and frequency of physical activity outside of school.

In this chapter, we compare the Pasifika student sub-group to all students in the national sample. When making these comparisons the national sample will be referred to as 'All Students'.

For some of the tables used in this chapter, particularly those associated with population sub-groups, fuller tables of averages, standard deviations, sample sizes, effect sizes, and 95 percent confidence intervals can be found in Appendix 4.

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<sup>22</sup> Students could identify with up to three ethnic groups. All students who identified as Pasifika were included in these analyses



## Success and achievement of Pasifika students in health and physical education – An overview

### Achievement in health and physical education

While Year 4 and Year 8 Pasifika students tended to achieve at a lower level than NZ European students, many features of Pasifika student achievement followed similar patterns to the national samples with a wide distribution of scores at both year levels and some overlap in the achievement of Year 4 students and Year 8 students (Chapter 3).

Pasifika students from low decile schools scored lower on average than those at high decile schools at Year 4 but there were no significant differences at Year 8. Achievement in critical thinking in health and physical education was similar at both year levels for boys and girls, and for students at different types of schools. However, the numbers for some of the comparisons were small.

Pasifika students made similar progress between Year 4 and Year 8 as All Students.

The majority of Pasifika and NZ European students' description of well-being was categorised as mental/emotional (taha hinengaro), social (taha whānau) and physical (taha tinana) dimensions of well-being. Understanding of well-being increased from Year 4 to Year 8 with the greatest differences being for the physical and spiritual dimensions of well-being. At both year levels very few students mentioned the spiritual (taha wairua) dimension of well-being.

Pasifika students' movement skills, strategic action skills, and movement sequences skills developed considerably from Year 4 to Year 8 showing a similar increase for All Students. At each year level, slightly more boys performed higher than girls on the first two of these skills, while more Year 4 Pasifika girls than boys demonstrated high level skills in movement sequences.

### Achievement against curriculum levels

Students' performance on the Critical Thinking for Health and Physical Education measure was aligned to the NZC levels in health and physical education. Ninety-two percent of Year 4 Pasifika students were achieving at Level 2 or above. This was similar to All Students and exceeds the expectations expressed in the NZC for health and physical education for Year 4 students. Twenty-seven percent of Year 8 Pasifika students were achieving at Level 4 or above. This was fewer than All Students (57 percent) and below the NZC expectations Year 8 students.

### Physical activities outside of school

The majority of Pasifika students at both year levels were involved frequently each week (more than 2-3 times a week) in physical activities outside of school with Year 8 students being more active than Year 4 students.

### Benchmarking Pasifika success

The national average on the Critical Thinking in Health and Physical Education scale at Year 4 and Year 8 is the benchmark for each respective year level. Just over one quarter of Pasifika students scored above the benchmark at Year 4 and Year 8. This was lower than for All Students. Pasifika students who scored above the benchmark reported similar attitudes to health and physical education compared with a group of Pasifika students who scored below the benchmark. In physical education, at both year levels Pasifika students above the benchmark reported having more frequent opportunities to use equipment to play and move around, and to learn new skills and different ways of moving. They also reported more frequent opportunities to learn about playing fair at Year 4, and to learn how to be safe when moving in different ways at Year 8.

### The interaction between decile and ethnicity

At each year level, a greater proportion of Pasifika students at high decile schools achieved above the benchmark than Pasifika students from mid and low decile schools. A study of how decile and ethnicity relate to achievement on the Critical Thinking in Health and Physical Education scale indicated that decile is strongly associated with achievement on this scale. Average Critical Thinking in Health and Physical Education scale scores increased with decile. In addition, there was an effect due to ethnicity which remained after accounting for the decile effect.

## 1. Year 4 Pasifika student achievement in health and physical education

Table 6.1 shows how Year 4 Pasifika students performed on the health and physical education assessment. It provides the average score on the Critical Thinking in Health and Physical Education scale, standard deviation and sample size.

Table 6.1 Year 4 Pasifika student overall achievement in Critical Thinking in Health and PE

	Critical Thinking in Health and PE
Average (scale score units)	75
SD (scale score units)	19
N	98

At Year 4 the average score for Pasifika students was 75 scale score units in Critical Thinking in Health and Physical Education. This was lower than the average of 89 scale score units for All Students but in the same band of achievement<sup>23</sup>. The 50 percent of Year 4 Pasifika students who clustered around the average would typically be able to demonstrate the same competencies described in Chapter 3 for All Students at Year 4.

A curriculum alignment exercise was undertaken to link performance ranges on the Critical Thinking in Health and Physical Education scale to the NZC (Appendix 3). Creating this link allowed scale scores for the health and physical education measure to be reported in terms of curriculum expectations. However, it should be noted that the scale does not assess the full range of the health and physical education learning area. Several aspects, e.g. understanding of well-being and movement skills were assessed and reported on separately.

Table 6.2 shows Year 4 Pasifika student performance on the Critical Thinking in Health and Physical Education measure at Level 2 of the NZC. It compares these results to those for All Students. Ninety-two percent of Pasifika students achieved at Level 2 or above, compared to 97 percent of All Students. This level represents the expected level of performance for Year 4 students at the end of the year and indicates that almost all students were achieving above the expected level in the domains assessed.

Table 6.2 Percentage of Year 4 Pasifika and All Students achieving at the NZC level 2 on the Critical Thinking in Health and PE measure

	Critical Thinking in Health and PE	
	Pasifika students (%)	All Students (%)
Level 2 and above	92	97
Not yet Level 2	8	3

<sup>23</sup> Performance bands for the health and physical education are described in Chapter 2.

## 2. Year 8 Pasifika student achievement in health and physical education

Table 6.3 provides the average scale score, standard deviation and sample size for Year 8 Pasifika students on the Critical Thinking in Health and Physical Education scale.

Table 6.3 - Year 8 Pasifika student overall achievement in Critical Thinking in Health and PE

	Critical Thinking in Health and PE
Average (scale score units)	97
SD (scale score units)	21
N	101

At Year 8, the average score for Pasifika students in Critical Thinking in Health and Physical Education was 97 scale score units, compared to 111 for All Students. Some of the middle 50 percent of Year 8 Pasifika students were beginning to demonstrate the same competencies described for All Students at Year 8 with others performing at the top of the previous performance band described for Year 4 students (Chapter 3).

Table 6.4 shows how Year 8 Pasifika students performed on the Critical Thinking in Health and Physical Education scale in terms of the NZC levels. Just over quarter of Pasifika students were achieving at Level 4 and above compared to just over half of All Students. Overall, Year 8 students were achieving below the NZC expectations for health and physical education.

Table 6.4 Percentage of Year 8 Pasifika and All Students achieving at the NZC level 4 on the Critical Thinking in Health and PE measure

	Critical Thinking in Health and PE	
	Pasifika students (%)	All Students (%)
Level 4 and above	27	51
Not yet Level 4	73	49

## 3. Comparison of Year 4 and Year 8 Pasifika student achievement

Figure 6.1 shows the distribution of Year 4 and Year 8 Pasifika students on the Critical Thinking in Health and Physical Education scale. As expected, on average Year 8 Pasifika students had higher achievement scores than Year 4 Pasifika students. Similar to the full national student group, there was a wide distribution of scores at both year levels.

Figures 6.2 and 6.3 illustrate the spread of achievement across the NZC levels for Year 4 and Year 8 Pasifika students on the Critical Thinking in Health and Physical Education measure. The blurred lines dividing the levels reflect the fact that these boundaries are not precisely defined and it is therefore not possible to be exact about the proportions of students within each level.

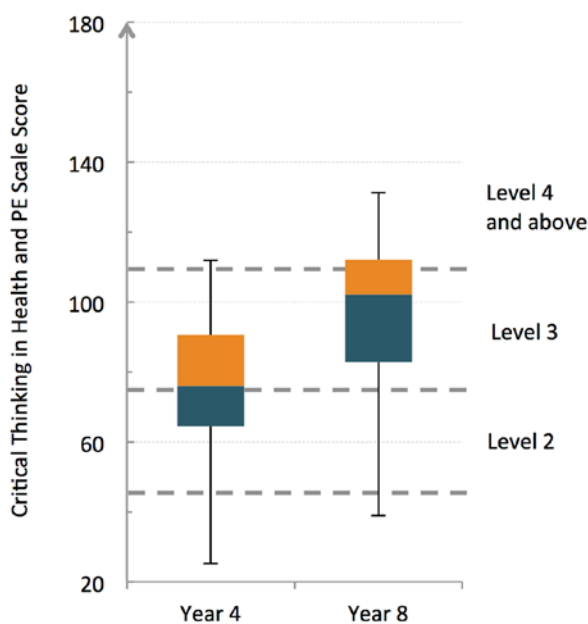


Figure 6.1 Pasifika student achievement for Critical Thinking in Health and PE

The figures show that almost all Year 4 Pasifika students were achieving at Level 2 and above, similar to All Students. Twenty-seven percent of Year 8 Pasifika students were achieving at Level 4 and above. This is less than the proportion of All Students at Year 8 achieving at that level.

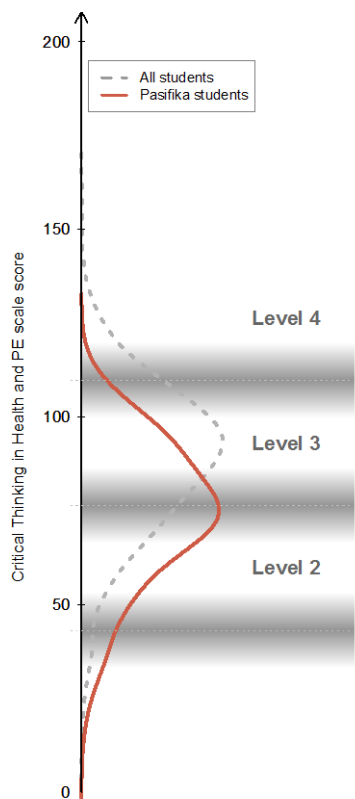


Figure 6.2 Distribution of Year 4 Pasifika and All Students achievement in Critical Thinking in Health and PE against levels of the NZC health and PE

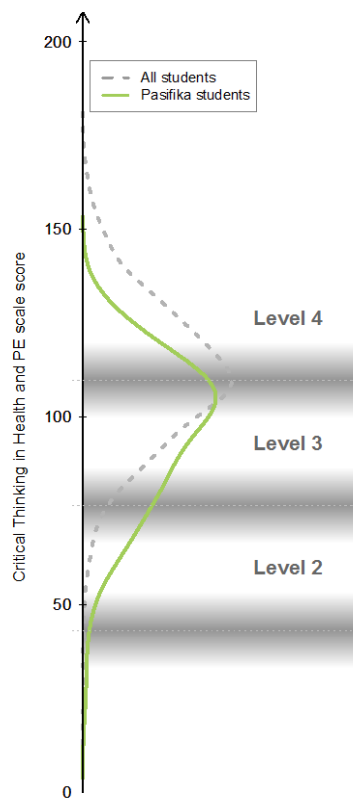


Figure 6.3 Distribution of Year 8 Pasifika and All Students achievement in Critical Thinking in Health and PE against levels of the NZC health and PE

Table 6.5 shows for the Critical Thinking in Health and Physical Education scale, the differences in average scores between Year 4 and Year 8 Pasifika students expressed in scale score units and effect size, and the averages and standard deviations.

The Pasifika student average score was lower than those of All Students at both year levels (See Chapter 3). However, the difference between the average scale score for Year 4 and Year 8 Pasifika students was the same as that for All Students - 22 scale score units. This corresponded to an average annual effect size of 0.28 for All Students and 0.27 for Pasifika students. Pasifika students made similar progress to All Students between Year 4 and Year 8.

Table 6.5 - Pasifika student achievement in Critical Thinking in Health and PE and difference of achievement by year level

	Critical Thinking in Health and PE	
	Year 4	Year 8
Average (scale score units)	75	97
SD (scale score units)	19	21
N	98	101
Year 4/Year 8 difference*	22	
Effect size	<b>1.08</b>	
Annual average effect size	0.27	

\* Difference = Year 8-Year 4

## Sub-group comparisons

Figures 6.4 and 6.5 display the level and spread of scores for Critical Thinking in Health and Physical Education for Year 4 and Year 8 Pasifika students respectively, for gender, school decile<sup>24</sup> and type of school<sup>25</sup>.

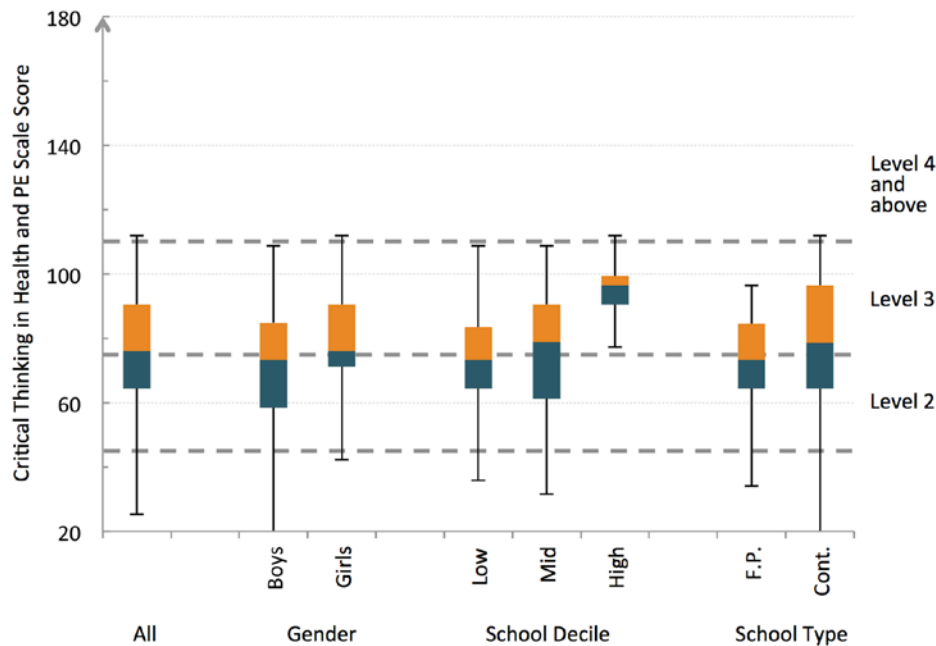


Figure 6.4 Year 4 Pasifika student scores for Critical Thinking in Health and PE by gender, school decile and type (F.P.=Full Primary, Cont.=Contributing)

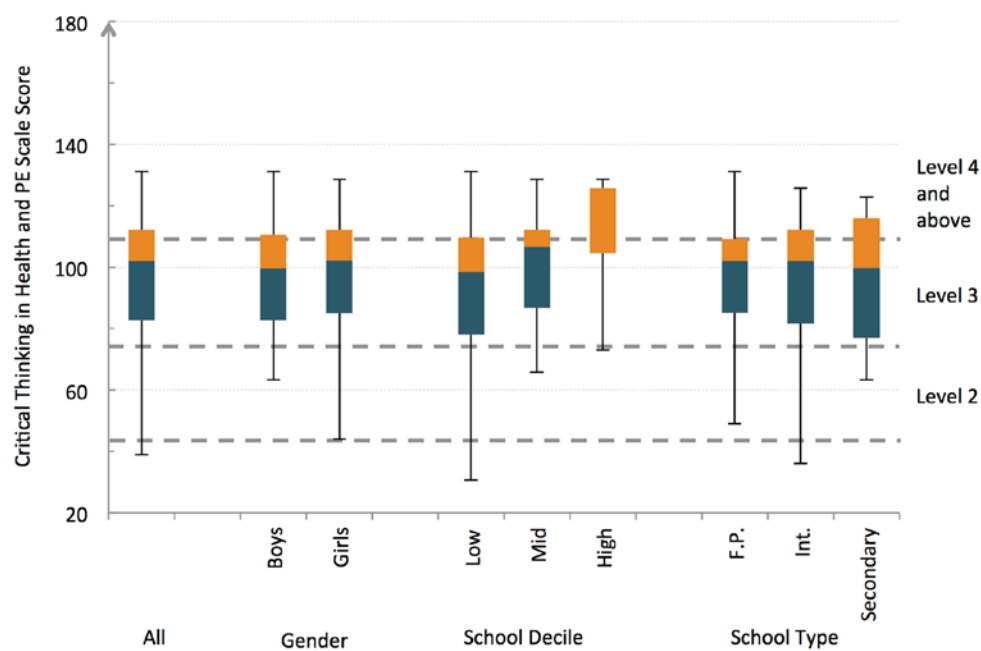


Figure 6.5 Year 8 Pasifika student scores for Critical Thinking in Health and PE by gender, school decile and type (F.P.=Full Primary, Int.=Intermediate)

<sup>24</sup> Low decile schools (1-3); Mid decile schools (4-7); High decile schools (8-10) (<http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/SchoolOperations/Resourcing/OperationalFunding/Deciles.aspx>)

<sup>25</sup> Full Primary (Year 1 – 8); Contributing (Year 1 – 6); Intermediate (Year 7 – 8); Composite (Year 1- 13); Secondary (Year 7-13)

Table 6.6 summarises average scale score differences and effect sizes between sub-groups at Year 4 and Year 8.

There is a pattern of increasing average scale scores for Pasifika students at both year levels attending low, mid and high decile schools. Year 4 Pasifika students from low decile schools scored significantly lower than those from high decile schools. No differences by decile were found at Year 8. Results did not differ by gender, or school type at either year level. For some of the comparisons the number of students is relatively small. The number of students within each sub-group is provided in Appendix 4.

Table 6.6 Year 4 and Year 8 Pasifika students: Sub-group differences on achievement in Critical Thinking in Health and PE

	Critical Thinking in Health and PE			
	Year 4		Year 8	
	Difference (scale score units)	Effect Size	Difference (scale score units)	Effect Size
<b>Gender</b>				
Boys/Girls	-7	0.39	2	-0.11
<b>School Decile</b>				
Low/Mid	-5	-0.25	-7	<b>-0.37</b>
Mid/High	-18	-0.98	-6	<b>-0.33</b>
Low/High	-21	<b>-1.26</b>	-13	<b>-0.60</b>
<b>School Type</b>				
Full Primary/Contributing	-6	-0.29	-	-
Full Primary/Intermediate	-	-	3	-0.12
Intermediate/Secondary	-	-	-1	0.05
Full Primary/Secondary	-	-	2	-0.06

Effect sizes in bold are statistically significant ( $p < .05$ )

The scale score differences have been calculated using non-rounded numbers, and are numerically correct. In some cases the scale score difference may not be the same as the simple difference in the pair of averages reported in the table.

N for Secondary = 8

Table 6.7 compares the differences between Year 8 and Year 4 students for each sub-group. The average annual effect sizes for these groups ranged from 0.20 to 0.34 (range of scale score unit differences (ssud) = 13 to 26). The average annual effect size for All Students was 0.28 (range of ssud = 21 to 25). The only sub-group that showed a non-significant difference between Year 4 and Year 8 achievement was for those students in high decile schools.

Table 6.7 Differences in Critical Thinking in Health and PE measure between Pasifika Year 4 and Year 8 by sub-group

	Critical Thinking in Health and PE				
	Year 4 average (scale score units)	Year 8 average (scale score units)	Difference* (scale score units)	Effect size	Average annual effect size
<b>Gender</b>					
Boys	72	98	26	1.32	0.33
Girls	79	96	16	0.81	0.20
<b>School Decile</b>					
Low	72	94	22	1.09	0.27
Mid	76	101	25	1.38	0.34
High	94	107	13	0.79	0.20

\* Difference = Year 8 – Year 4. The scale score differences have been calculated using non-rounded numbers, and are numerically correct. In some cases the scale score difference may not be the same as the simple difference in the pair of averages reported in the table.

Effect sizes in bold are statistically significant ( $p < .05$ )

Ns for High = 4 (Year 4) and 6 (Year 8)

## 4. Pasifika students' understanding of well-being, movement skills and reported physical activity

As explained in Chapter 3 the NZC identifies the concept of Hauora as being at the heart of learning in Health and PE. Hauora is defined as a Māori philosophy of well-being that includes four dimensions: spiritual (taha wairua), mental/emotional (taha hinengaro), social (taha whānau) and physical (taha tinana). Students were told there are lots of different kinds of things that people do or have in their life to help them feel well or happy. They were asked to draw pictures or write words to show the things that people do or have to help keep them well or happy. They discussed the pictures with an interviewer. Interviews were analysed and elements of well-being identified were categorised into the different dimensions of well-being. Percentage frequencies reported in tables in this section may not always sum to 100 percent due to rounding.

Table 6.8 displays the percentage of Pasifika students at Year 4 and Year 8 whose responses were categorised into each of the four dimensions of well-being, alongside those for NZ European students. See Table 3.20, Chapter 3 for the examples of how student responses were categorised.

Table 6.8 Percentage of students identifying dimensions of well-being by year level and ethnicity

	Year 4		Year 8	
	Pasifika (%) N = 98	NZE (%) N = 481	Pasifika (%) N = 102	NZE (%) N = 457
Physical	45	63	59	72
Mental/Emotional	86	85	92	93
Social	78	71	83	86
Spiritual	9	4	23	13

Similar high proportions of Pasifika and NZ European students described the mental/emotional and social dimensions of well-being. At each year level, fewer Pasifika students than NZ Europeans described the physical dimension, and more Pasifika than NZ European students mentioned the spiritual dimension although both were low.

Overall these results show that the percentage of each dimension of well-being described increased from Year 4 to Year 8 with the greatest differences being for the physical and spiritual dimensions for Pasifika students.

### Movement skills

The following tables display the percentage of Pasifika students by gender for movement skills on three tasks: Ripa Tag (Table 6.9 and 6.10), Rua Tapawhā (Table 6.11 and 6.12), and Movement Sequences (Table 6.13 and 6.14). Refer to Chapter 3 for the description of the tasks and skills assessed, the scoring guide for each task and the findings for All Students.

Year 4 Pasifika students on average demonstrated low to mid range skills in movement skills and strategic action skills, similar to All Students. Boys scored slightly higher than girls in strategic action skills but unlike All Students, not in movement skills. Year 8 students performed on average in the mid to high range of skills for these movement skills, similar to All Students. There was still a gender difference with more boys than girls at the high skill level. However, a greater percentage of Pasifika girls scored in the high range at Year 8 for strategic action skills than for girls in All Students.

Similar to All Students, Pasifika students at both year levels showed stronger skills (mid-high to high range) in movement sequences than the other categories of movement skills, with smaller difference between boys and girls. Although more girls than boys performed at the mid and high skill levels at Year 4, at Year 8 performances were similar.

Table 6.9 Pasifika Year 4 Movement skills: Percentage of students scoring at each level for 'Rippa Tag' activity by year and gender

	Pasifika students		
	All (%)	Boys (%)	Girls (%)
Student displays all/almost all aspects from high range movement list	7	7	7
Student displays a variety of aspects – mainly mid range with some high range movements	24	30	16
Student displays a few aspects from mid range with some low range movements	51	47	56
Student displays low range movements	18	16	21

Table 6.10 Pasifika Year 8 Movement skills: Percentage of students scoring at each level for 'Rippa Tag' activity by year and gender

	Pasifika students		
	All (%)	Boys (%)	Girls (%)
Student displays all/almost all aspects from high range movement list	19	28	13
Student displays a variety of aspects – mainly mid range with some high range movements	36	38	34
Student displays a few aspects from mid range with some low range movements	29	21	36
Student displays low range movements	16	13	18

Table 6.11 Pasifika Year 4 Strategic action skills: Percentage of students scoring at each level for 'Rua Tapawhā' activity by year and gender

	Pasifika students		
	All (%)	Boys (%)	Girls (%)
Student displays all/almost all aspects from high range movement list	5	7	2
Student displays a variety of aspects – mainly mid range with some high range movements	39	39	40
Student displays a few aspects from mid range with some low range movements	47	44	51
Student displays low range movements	9	11	7

Table 6.12 Pasifika Year 8 Strategic action skills: Percentage of students scoring at each level for 'Rua Tapawhā' activity by year and gender

	Pasifika students		
	All (%)	Boys (%)	Girls (%)
Student displays all/almost all aspects from high range movement list	28	32	25
Student displays a variety of aspects – mainly mid range with some high range movements	50	51	48
Student displays a few aspects from mid range with some low range movements	17	15	18
Student displays low range movements	6	2	9



Table 6.13 Pasifika Year 4 Movement sequences skills: Percentage of students scoring at each level for 'Movement Sequences' activity by year and gender

	Pasifika students		
	All (%)	Boys (%)	Girls (%)
High range: Includes 4 or more elements, 3 aspects of consistency, and 3 aspects of co-operative work	25	21	30
Mid-high range: Includes 2-3 elements, 2 aspects of consistency, and 2 aspects of co-operative work	58	56	60
Low-mid range: Includes at least 3 movements/one element, 1 aspect of consistency, and 1 aspect of co-operative work	16	21	9
Low range: No response/don't know, does not complete 3 movements, no evidence of consistency, and no evidence of co-operative work	1	2	0

Table 6.14 Pasifika Year 8 Movement sequences skills: Percentage of students scoring at each level for 'Movement Sequences' activity by year and gender

	Pasifika students		
	All (%)	Boys (%)	Girls (%)
High range: Includes 4 or more elements, 3 aspects of consistency, and 3 aspects of co-operative work	34	38	30
Mid-high range: Includes 2-3 elements, 2 aspects of consistency, and 2 aspects of co-operative work	55	51	59
Low-mid range: Includes at least 3 movements/one element, 1 aspect of consistency, and 1 aspect of co-operative work	10	11	9
Low range: No response/don't know, does not complete 3 movements, no evidence of consistency, and no evidence of co-operative work	1	0	2

## Physical activity

Table 6.15 shows the percentage of Pasifika students engaging in physical activities out of school at Year 4 and Year 8. Sixty-three percent of Pasifika students at Year 4 and 86 percent at Year 8 were frequently involved in physical activities (2-3 times a week or more).

Notably fewer Pasifika than NZ European students were involved in physical activities frequently at Year 4 (63 percent compared with 85 percent). The difference at Year 8 was much smaller (86 percent compared with 91 percent).

Table 6.15 Percentage of students reporting different frequency of physical activity outside of school by year level and ethnicity

	Year 4		Year 8	
	Pasifika (%) N = 97	NZE (%) N = 479	Pasifika (%) N = 102	NZE (%) N = 453
Nearly every day	36	50	41	57
2-3 times a week	27	35	45	34
About once a week	23	10	9	5
Hardly ever	14	4	5	3

When asked whether they would like to do more, less or about the same level of physical activity (Table 6.16) just over half of Year 4 Pasifika students and a greater percentage (64 percent) of Year 8 Pasifika students said they would like to do more.

Table 6.16 Percentage of students reporting their desired level of physical activity by year level and ethnicity

	Year 4		Year 8	
	Pasifika (%) N = 98	NZE (%) N = 480	Pasifika (%) N = 102	NZE (%) N = 456
More	56	55	64	53
Less	10	1	4	1
About the same	34	43	32	46

The number of Pasifika students who identified different types of barriers to greater physical activity was too small to accurately report on. However, it should be noted that only three Pasifika students at Year 4 identified barriers to participating in more physical activity outside of school (all health related). At Year 8 the corresponding number was 16, and almost half of those reported being busy with other things as the primary barrier to being more physically active.

## 5. Benchmarking Pasifika Success

This section contrasts the profiles of Year 4 and Year 8 Pasifika students who scored above the national average at their year level. They are compared with students from the All Students group who also scored above the national averages for Year 4 and Year 8 respectively, on the Critical Thinking in Health and Physical Education scale. The 2013 national averages serve as benchmark scores with which to compare health and physical education results for different groups this year. These benchmarks may also be used to compare health and physical education results across future cycles of NMSSA health and physical education.

Table 6.17 shows the number (and percentage) of Year 4 and Year 8 Pasifika and All Students who scored above the benchmarks for their year level, along with the level and spread of their scores on the Critical Thinking in Health and Physical Education measure. At Year 4, 27 percent of Pasifika students scored above the benchmark compared with 53 percent of All Students at Year 4. At Year 8, a similar percentage of Pasifika students scored above the benchmark. The difference between Pasifika and All Students scoring above the benchmark was similar at Year 8 (26 percent compared with 50 percent). Of the students scoring above the benchmarks, Pasifika students scored 6 scale score units lower than All Students at Year 4, and 8 scale units lower at Year 8.

Table 6.17 Summary statistics for Year 4 and Year 8 Pasifika and All Students scoring above their respective benchmarks

	Critical Thinking in Health and PE			
	Year 4 students scoring above the national Year 4 average		Year 8 students scoring above the national Year 8 average	
	Pasifika students	All students	Pasifika students	All students
<b>Number above benchmark</b> (of total group)	26 (98)	410 (776)	26 (101)	381 (762)
<b>Percentage of respective group (%)</b>	27	53	26	50
<b>Average</b> (scale score units)	98	104	119	127
<b>SD</b> (scale score units)	6	11	6	12

Figures 6.6 and 6.7 contrast the group of Pasifika students scoring above the benchmark with the group of All Students who scored above the benchmark at Year 4 and Year 8 respectively in relation to gender, and attitudes to health and physical education. At both year levels the above benchmark groups of Pasifika and All Students showed broadly similar patterns with respect to gender and Attitude to Health and Attitude to Physical Education. There was no clear pattern relating health and physical education achievement with Attitude to Health or Attitude to Physical Education for students who achieved above the benchmark.

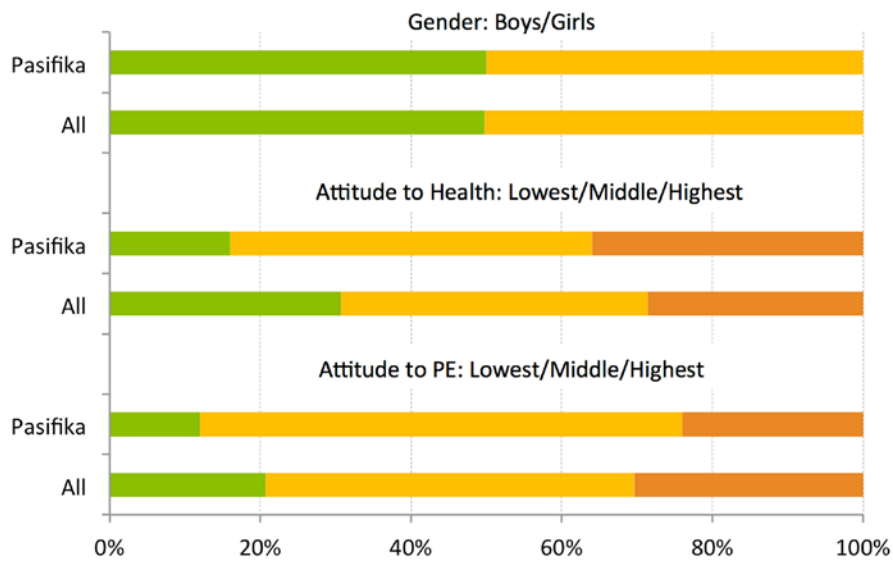


Figure 6.6 Year 4: Percent of Pasifika students and all students scoring above the benchmark on Critical Thinking in Health and PE by gender and Attitude to Health and PE

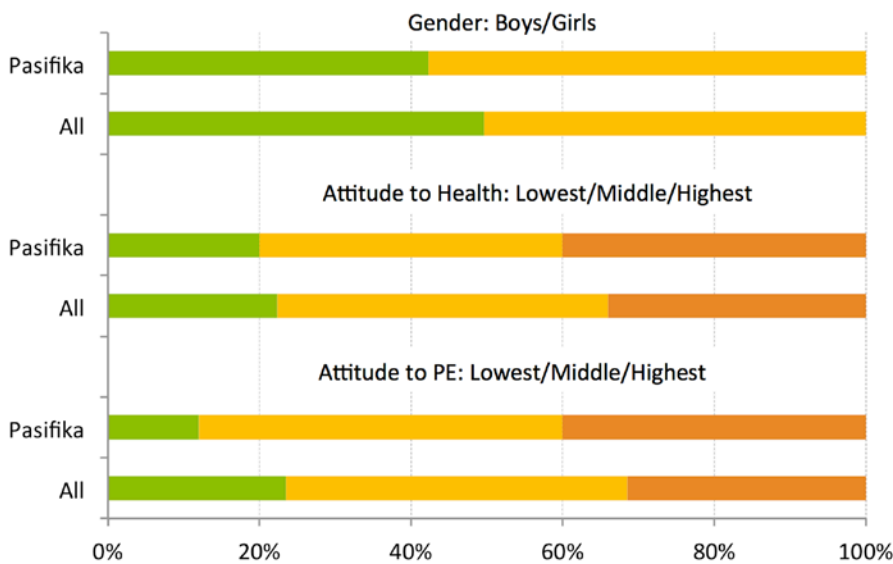


Figure 6.7 Year 8: Percent of Pasifika students and all students scoring above the benchmark on Critical Thinking in Health and PE by gender and Attitude to Health and PE

## Pasifika students and opportunities to learn health and physical education

When a particular group is achieving at a high level, it is informative to try and determine factors that are associated with their success, which are not present for the less successful group.

This section compares Pasifika students who scored above the benchmark to a similar sized group of Pasifika students who gained the lowest scores on the Critical Thinking in Health and Physical Education scale with respect to opportunities to learn health and physical education. To make comparisons easily the two low frequency categories – ‘Not at all’ and ‘A little’ are combined, and compared with the two high frequency categories - ‘Quite a lot’ and ‘Heaps’.

Tables 6.18 to 6.21 compare statements about the opportunities to learn in health and in physical education reported by students who achieved above the benchmark and by students who scored below. It should be noted that the numbers in these groups are small, and differences cannot be considered as nationally representative.

Overall, the pattern of responses of Pasifika students above the benchmark and those below the benchmark at both year levels were very similar with respect to opportunities to learn health. In physical education some differences were observed. At both year levels Pasifika students in the above benchmark group reported having more frequent opportunities to use equipment to play and move around, and to learn new skills and different ways of moving. At Year 4, more students in the below benchmark group reported having no or very little opportunity to learn about playing fair, and at Year 8, having no or very little opportunity to learn how to be safe when moving in different ways.

Table 6.18 Year 4 Pasifika students: Opportunities to learn health by above benchmark and low achievement groups on Critical Thinking in Health and PE

	Year 4 Pasifika students scoring above benchmark (N=26)		Comparison group of Year 4 Pasifika students with lowest achievement (N=26)	
	Not at all/ A little (%)	Quite a lot/ Heaps (%)	Not at all/ A little (%)	Quite a lot/ Heaps (%)
Work in groups to think about and discuss things in health	44	56	50	50
Learn something in health that is important to me	32	68	21	79
Take action to improve my health after learning something in class	17	83	28	72
Share things I've learned about health with others	44	56	40	60
My whole class does things that help me learn about health	40	60	40	60

Table 6.19 Year 8 Pasifika students: Opportunities to learn health by above benchmark and low achievement groups on Critical Thinking in Health and PE

	Year 8 Pasifika students scoring above benchmark (N=26)		Comparison group of Year 8 Pasifika students with lowest achievement (N=26)	
	Not at all/ A little (%)	Quite a lot/ Heaps (%)	Not at all/ A little (%)	Quite a lot/ Heaps (%)
Work in groups to think about and discuss things in health	44	56	46	54
Learn something in health that is important to me	24	76	31	69
Take action to improve my health after learning something in class	40	60	48	52
Share things I've learned about health with others	62	38	54	46
My whole class does things that help me learn about health	36	64	38	62

Table 6.20 Year 4 Pasifika students: Opportunities to learn PE by above benchmark and low achievement groups on Critical Thinking in Health and PE

	Year 4 Pasifika students scoring above benchmark (N=26)		Comparison group of Year 4 Pasifika students with lowest achievement (N=26)	
	Not at all/ A little (%)	Quite a lot/ Heaps (%)	Not at all/ A little (%)	Quite a lot/ Heaps (%)
Use equipment to play and move around	16	84	40	60
Have challenges like making up movement patterns or solving problems	28	72	28	72
Work in teams or groups	12	88	20	80
Learn about playing fair	8	92	20	80
Learn how to be safe when I am moving in different ways	16	84	17	83
Learn new skills and different ways of moving	8	92	24	76

Table 6.21 Year 8 Pasifika students: Opportunities to learn PE by above benchmark and low achievement groups on Critical Thinking in Health and PE

	Year 8 Pasifika students scoring above benchmark (N=26)		Comparison group of Year 8 Pasifika students with lowest achievement (N=26)	
	Not at all/ A little (%)	Quite a lot/ Heaps (%)	Not at all/ A little (%)	Quite a lot/ Heaps (%)
Use equipment to play and move around	4	96	20	80
Have challenges like making up movement patterns or solving problems	28	72	27	73
Work in teams or groups	4	96	15	85
Learn about playing fair	8	92	12	88
Learn how to be safe when I am moving in different ways	0	100	24	76
Learn new skills and different ways of moving	4	96	15	85

### Pasifika student achievement by decile

Tables 6.22 and 6.23 show the total number of Year 4 Pasifika and NZ European students respectively, assessed in health and physical education and the number of each group who achieved above the benchmark for their year, broken down by school decile. Tables 6.24 and 6.25 show the corresponding results for Year 8 students. It should be noted that the numbers of Pasifika is very low in some sub-groups and the findings should be interpreted with caution.

At Year 4, about 90 percent of Pasifika students came from low and mid decile schools, with two thirds from low decile schools. This contrasts with just under 50 percent of NZ European students attending low and mid decile schools. At Year 8, 95 percent of Pasifika students came from low and mid decile schools compared to 59 percent of NZ European students.

By number, the majority of Pasifika students who scored above the benchmark came from low and mid decile schools. However when one considers the total number of Pasifika students attending each decile group, the picture changes. A greater proportion of the Pasifika students from high decile schools scored above the benchmark than those who attended mid and low decile schools. This was similar to the national sample and the Māori sample (Chapters 3 and 5). For example, at Year 4, 9 percent of all Pasifika students

attended high decile schools. Seventy-eight percent of those students scored above the benchmark. In contrast 65 percent of all Pasifika students attended low decile schools and only 19 percent of those scored above the benchmark. This pattern is very similar to that observed in the NMSSA assessment of achievement in Science (2012).

Table 6.22 Year 4: Number and percentage of Pasifika students by school decile who participated in Critical Thinking in the Health and PE and achieved above the benchmark

School Decile	Pasifika Students		Pasifika students who achieved above the national average as a percentage of all Pasifika in that decile group	
	N	%	N	%
Low	64	65	12	19
Mid	25	26	7	28
High	9	9	7	78
Total	98	100	26	-

Table 6.23 Year 4: Number and percentage of NZ European students by school decile who participated in Critical Thinking in the Health and PE and achieved above the benchmark

School Decile	NZ European		NZ European students who achieved above the national average as a percentage of all NZ European in that decile group	
	N	%	N	%
Low	48	10	22	46
Mid	186	39	118	63
High	249	52	164	66
Total	483	100	304	-

Table 6.24 Year 8: Number and percentage of Pasifika students by school decile who participated in Critical Thinking in the Health and PE and achieved above the benchmark

School Decile	Pasifika Students		Pasifika students who achieved above the national average as a percentage of all Pasifika in that decile group	
	N	%	N	%
Low	66	65	15	23
Mid	30	30	9	30
High	5	5	2	40
Total	101	100	26	-

Table 6.25 Year 8: Number and percentage of NZ European students by school decile who participated in Critical Thinking in the Health and PE and achieved above the benchmark

School Decile	NZ European		NZ European students who achieved above the national average as a percentage of all NZ European in that decile group	
	N	%	N	%
Low	32	7	19	59
Mid	236	52	126	53
High	187	41	125	67
Total	455	100	270	-

## The interaction between decile and ethnicity

Reporting on differences between groups of students in New Zealand by ethnicity is a complex matter. Analysis is complicated on two counts. First, as already reported, ethnic groups (Pasifika and NZ European) are disproportionately represented across deciles, with a high proportion of Pasifika students and small proportion of NZ European students attending lower decile schools. Secondly, students may identify with more than one ethnic group. It is difficult to make robust statistical statements about these two groups when there is substantial "blurring" with regard to group membership.

To attempt to extrapolate an accurate picture, the health and physical education dataset for this analysis has been reduced to those who identify with Pasifika, NZ European, or both ethnic groups, and decile has been grouped by quintile<sup>26</sup>.

For each year level separately, models were run to examine effects on performance on the Critical Thinking in Health and Physical Education scale due to quintile and ethnicity. The models showed that there was an effect due to ethnicity which remained after accounting for the quintile effect at both year levels. That is, there was a difference in average critical thinking scores between Pasifika and NZ European students over and above the difference accounted for by quintile. This difference was constant (as far as the model can determine) across all quintiles.

At Year 4 there was a difference of 15 scale score units on average between Pasifika and NZ European performance on the Critical Thinking in Health and Physical Education scale after quintile has been taken into account. This equates to an effect size of about 0.7. At Year 8, Pasifika students scored lower than NZ European on average, by about the same amount - 14 scale score units.

These results should be interpreted with caution. The model's ability to precisely assess how Pasifika students are performing in higher decile schools (and how NZ European students are performing in lower decile schools) is compromised by the disproportionate numbers of students in those deciles with respect to their ethnicity. Details of this analysis can be found in Appendix 5 along with graphics giving an overall representation of the results. The graphics display important information about the distribution of ethnic groups across quintiles, and the variability of scores within quintile.

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<sup>26</sup> Decile 1-2 → Quintile 1, Decile 3-4 → Quintile 2, ... , Decile 9-10 → Quintile 5

# 7 Achievement of Students with Special Education Needs in Health and Physical Education

This chapter presents the findings for achievement in health and physical education (PE) of students with special education needs at Year 4 and Year 8. It also reports on differences in achievement between students with special education needs and between year levels. The chapter presents achievement of students with special education needs against the levels of the NZC health and physical education and provides details about the decile, gender and attitudes to health and physical education of students with special education needs who achieved above the national average on the Critical Thinking in Health and Physical Education measure at Year 4 and Year 8.

In this chapter, we compare students with special education needs to all students in the national sample. As in chapters 5 and 6, when making these comparisons the national sample will be referred to as 'All Students'. We also make comparisons to a complementary group of students who do not fall into any of the special education needs categories. This group is referred to as the 'no special education needs' group.

The number of special education needs students in the 2013 was relatively small. This means findings should be interpreted with caution.

Some tables in this chapter contain asterisks. Asterisks are used to indicate where there are very small sample numbers and it is impossible to report percentages or other statistics meaningfully. All statistical details about sample sizes, sub-group average scale scores, standard deviations, effect sizes and confidence intervals are contained in Appendix 4.



## Success and achievement of students with special education needs in health and physical education – An overview

### Participation of students with special education needs

Students with high and moderate special education needs were included in NMSSA. Although the number of students with high special education needs was small, students with moderate special education needs made up seven percent of All Students at Year 4, and five percent at Year 8. Students on referral were not included in the analyses due to the very small number identified (0.5 percent). Due to the small numbers of students with special education needs, findings need to be interpreted with caution. The high special needs group in particular was too small to be considered nationally representative.

### Achievement in health and physical education

At both year levels, students with high or moderate special education needs tended to achieve at a lower level than those with no special education needs. However, the overlap between the groups indicated that there were students, particularly those with moderate special education needs, who were achieving at the same level as, or above students with no special education needs.

The difference in average scale scores on the Critical Thinking in Health and Physical Education measure between Year 4 and Year 8 students with moderate special education needs was similar to that of Year 4 and Year 8 students with no special education needs. This indicates that a similar rate of progress was found for both groups.

At Year 4, almost all students with moderate special education needs were achieving at Level 2 or above of the NZC, similar to students with no special education needs. Overall, Year 4 students' achievement exceeded the expectations expressed in the NZC. At Year 8, just over 40 percent of students with moderate special education needs were achieving at Level 4 or above of the NZC compared with 52 percent of All Students. Overall, Year 8 student achievement was below the expectations expressed in the NZC.

### Attitudes to health and physical education, and opportunities to learn

Average scale scores for Attitude to Health decreased between Year 4 and Year 8 for students with no special education needs but not for students with moderate education needs. Average scores for Attitude to Physical Education declined very little between Year 4 and Year 8 and differences were not statistically significant for any groups.

Students with special education needs reported having a similar range of opportunities to learn health and physical education as students with no special education needs.

### Benchmarking success for studies with special education needs

Twenty-eight percent of Year 4 students and 38 percent of Year 8 students with moderate special education needs achieved above their respective national average compared to about 50 percent of All Students. There was a slightly greater percentage of boys in the special education needs group compared with the All Students group. This reflects the composition of the national sample of students with special education needs. Students with special education needs who achieved above the national average benchmark tended to come from mid and high decile schools as was the case for All Students.

### Inclusion of students with special education needs in health and physical education

Almost all principals at both year levels rated their school's inclusion of students with special education needs in the health and physical education programme as good to excellent.

## 1. Students with special education learning needs in NMSSA

The study includes students with special education needs in the assessment programme.

Participating schools identified students' special education needs<sup>27</sup> using the following categories:

- High: For example, ORS funded, Supplementary Learning Support, severe behaviour or communication assistance from Special Education
- Moderate: For example, provided with a teacher aide from school funds, on the case load for Resource Teachers: Learning and Behaviour (RTLB), or Child Youth and Family Services (CYFS)
- On referral: For example, to Special Education or CYFS with action pending.

Students not falling into any of the above categories were assigned to the 'no special education needs' group.

No students on referral completed the health and physical education assessment at Year 4, with only one student doing so at Year 8. This number is lower than the 2012 NMSSA study, for which students on referral made up 4 percent of the sample at both year levels. The lower number of students falling within the on referral category for the health and physical education assessment was likely due to the timing and manner of collecting the information from schools.<sup>28</sup> The 'on referral' category is not discussed further in this chapter.

Students with special education needs were invited to participate using the level of assistance normally provided to them. Schools and parents were able to withdraw any students for whom the experience of participating in NMSSA would be inappropriate. For example, a child may have been withdrawn if they had: very high special education needs that could not be accommodated, anxiety, or behaviour issues.

The assessment of health and physical education was undertaken using individual assessment approaches (one-to-one interviews and performance activities) delivered to approximately 770 students at each year level rather than a paper-and-pencil approach that is delivered to approximately 2,000 students. Therefore, for students with special education needs this is less likely to be a nationally representative sample and the findings are indicative only. This is particularly true with regard to the high special education needs group from which many of the special education needs student withdrawals are likely to have come.

Table 7.1 and Table 7.2 display the Year 4 and Year 8 groups of students with special education needs who completed the Critical Thinking in Health and Physical Education measure by gender and decile. Although the numbers of students with high special education needs were very small (0.5 percent of the sample), the number with moderate special education needs was larger and allowed analysis of achievement and some comparison with the national sample. Students with moderate special education needs made up 7 percent of the national sample at Year 4 and 5 percent at Year 8. Descriptive information about the achievement of students with high special education needs is reported in this chapter, but no comparative statistical analyses are included due to the small numbers.

There were approximately twice as many boys than girls with special education needs at both year levels. The gender split for the 'no special education needs' group was more even at both year levels. At Year 4, students with special education needs came equally from schools across the three decile groups with slightly more coming from mid-decile schools at Year 8. This was similar to the group of students with no special education needs.

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<sup>27</sup> The categories of special education needs were those common in schools and therefore easy for schools to respond to. Schools were asked to describe the funding supports in place for children with special education needs to access the curriculum, through ORS, SLS, RTLB, Ministry of Education specialist staff, and school funds. To capture any unmet needs they were also asked to note students who were on referral to Ministry of Education specialist staff, RTLB etc. These categories were discussed and endorsed by the NMSSA special education needs reference group.

<sup>28</sup> In 2012 and 2013 the procedure asked schools to identify any students for whom participating in NMSSA would not be appropriate due to high special education needs (ORS funded), ESOL, Māori Immersion or the experience would be anxiety provoking. In 2012 after the school visits to collect data, schools were asked to identify students who were 'on referral'. In 2013 schools were asked to identify students who were on referral when the list of students to be included in the study was initially selected. There was also a change in the method of returning this information to NMSSA: in 2012 it was by email; in 2013 it was by email or online.

Table 7.1 Breakdown of Year 4 students with special education needs and no special education needs by gender and decile school

	All		Gender		Decile		
	N	%	Boys (N)	Girls (N)	Low (N)	Mid (N)	High (N)
High special education needs	2	<1	1	1	2	0	0
Moderate special education needs	53	7	36	17	17	18	18
On referral	0	0	0	0	0	0	0
No special education needs	721	93	377	344	166	257	298
<b>Total</b>	<b>776</b>	<b>100</b>	<b>414</b>	<b>362</b>	<b>185</b>	<b>275</b>	<b>316</b>

Table 7.2 Breakdown of Year 8 students with special education needs and no special education needs by gender and decile school

	All		Gender		Decile		
	N	%	Boys (N)	Girls (N)	Low (N)	Mid (N)	High (N)
High special education needs	5	1	2	3	1	3	1
Moderate special education needs	37	5	25	12	11	15	11
On referral	1	<1	1	0	0	1	0
No special education needs	719	94	350	369	151	342	226
<b>Total</b>	<b>762</b>	<b>100</b>	<b>378</b>	<b>384</b>	<b>163</b>	<b>361</b>	<b>238</b>

## 2. Year 4 achievement in health and physical education for students with special education needs

Table 7.3 shows the average health and physical education score and standard deviation for Year 4 students on the Critical Thinking in Health and Physical Education measure in different categories of special education needs compared with students with no special education needs.

Table 7.3 Health and PE achievement of Year 4 students with special education needs and no special education needs

	Critical Thinking in Health and PE		
	N	Average (scale score units)	SD (scale score units)
High special education needs	2	70	21
Moderate special education needs	53	78	20
No special education needs	721	89	20

The average score in Critical Thinking in Health and Physical Education was 70 scale score units for Year 4 students with high special education needs and 78 for students with moderate special education needs.

Drawing on the scale description for the critical thinking measure, the Year 4 students with moderate special education needs whose scores clustered around the average (the middle 50 percent), was similar to the national group. They typically were able to:

- share their understandings, ideas, or viewpoints;
- identify factors that impact on well-being generally;
- and practices to support their well-being;
- to recognise general health messages;
- suggest general reasons for actions and reactions when people are responding to problems or issues;
- participate in ball games.

A curriculum alignment exercise was undertaken to link performance ranges on the Critical Thinking in Health and Physical Education scale to the NZC. Creating this link allows scale scores to be reported in terms of curriculum expectations. See Appendix 3.

Table 7.4 shows that, for Critical Thinking in Health and Physical Education at Year 4, 96 percent of the 53 students with moderate special education needs achieved at Level 2 or above, similar to that of students who had no special education needs. This exceeded the NZC expectations for Year 4 students.

Table 7.4 Percentage of Year 4 students with different special education needs achieving at the NZC level 2 on the Critical Thinking in health and PE measure

	Critical Thinking in Health and PE		
	High Special Education Needs (N=2)	Moderate Special Education Needs (N=53)	No special education needs (N=721)
Level 2 and above	*	96	97
Not yet Level 2	*	4	3

\* There were too few students with high education needs to report.

Table 7.5 displays the differences in scale score units between the students with moderate special education needs and those with no special education needs at Year 4. These differences are also expressed as effect sizes. Students with moderate special education needs scored significantly lower than students with no special education needs. The scale score unit difference (ssud) was 12, and an effect size of 0.57.

Table 7.5 Year 4 difference in Health and PE achievement between students with moderate special education needs and students with no special education needs

	Critical Thinking in Health and PE	
	Difference (scale score units)	Effect Size
No special education needs/Moderate special education needs	12	0.57

Effect sizes in bold are statistically significant ( $p < .05$ )

### 3. Year 8 achievement in health and physical education for students with special education needs

Table 7.6 displays the mean and standard deviation on the Critical Thinking in Health and Physical Education measure for Year 8 students in different categories of special education needs compared with students with no special education needs.

Table 7.6 Health and PE achievement of Year 8 students with special education needs and no special education needs

	Critical Thinking in Health and PE		
	N	Average (scale score units)	SD (scale score units)
High special education needs	5	89	21
Moderate special education needs	37	104	17
No special education needs	719	112	20

The average scores for Year 8 students in Critical Thinking in Health and Physical Education were 89 and 104 scale score units for students with high and moderate special education needs respectively.

Drawing on the scale description for the critical thinking measure, the middle 50 percent of Year 8 students with moderate special education needs typically were beginning to identify their own perspective and begin to acknowledge alternative viewpoints; identify factors that impact on the well-being of themselves and others; explain strategies and actions to promote their well-being; recognise general health messages and state ways to inform others about these; identify specific reasons for actions and reactions when people are responding to problems/issues; and identify movements needed to participate in ball games and some strategies they can employ.

Table 7.7 shows how Year 8 students with special education needs performed on the Critical Thinking in Health and Physical Education measure in terms of NZC levels. Forty-one percent of students with moderate special education needs achieved at Level 4 or above compared with 52 percent of students with no special education needs. Overall, Year 8 students were achieving below the expectations expressed in the NZC for Year 8.

Table 7.7 Percentage of Year 8 students with different special education needs achieving at the NZC level 4 on the Critical Thinking in health and PE measure

	Critical Thinking in Health and PE		
	High Special Education Needs (N=5)	Moderate Special Education Needs	No Special Education Needs (N=719)
Level 4 and above	*	41	52
Not yet Level 4	*	59	48

\* There were too few students with high education needs to report.

Table 7.8 compares the difference in scale scores (and the associated effect sizes) between students at Year 8 with moderate and no special education needs. The difference in achievement (an ssud of 8 and an effect size of 0.41) was not statistically significant.

Table 7.8 Year 8 difference in health and PE achievement between students with moderate special education needs and students with no special education needs

	Critical Thinking in Health and PE	
	Difference (scale score units)	C
No special education needs/Moderate special education needs	8	0.41

#### 4. Comparison of Year 4 and Year 8 student achievement in health and physical education for students with special education needs

Figures 7.1 and 7.2 show the distribution of scale scores for Year 4 and Year 8 students with special education needs on the Critical Thinking in Health and Physical Education measure. The very small numbers of high special education needs students have been excluded from comparisons with other groups in this section.

On average, Year 8 students with moderate and no special education needs had higher achievement scores than the corresponding students at Year 4. However, similar to All Students, there was notable overlap in the achievement between the Year 4 and Year 8 samples.

Table 7.9 displays the differences between Year 4 and Year 8 achievement and the associated effect sizes for the different categories of special education needs. This table details the difference in average scores between one cohort of students at Year 4 and another at Year 8. We use this difference to provide an estimate of progress between these year levels. It must be noted that this is not a measure of actual progress by a particular group of students.

The scale score differences between Year 4 and Year 8 students in the moderate and no special education needs groups were 26 and 23 scale score units respectively. The differences represented average annual effect sizes of 0.35 and 0.28, indicating that students with moderate special education needs were progressing on average from Year 4 to Year 8 at least as well as those with no special education needs.

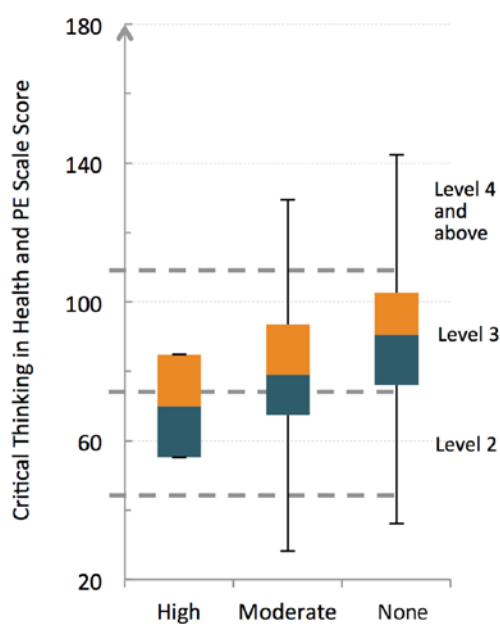


Figure 7.1 Achievement of Year 4 students with special education needs for Critical Thinking in Health and PE

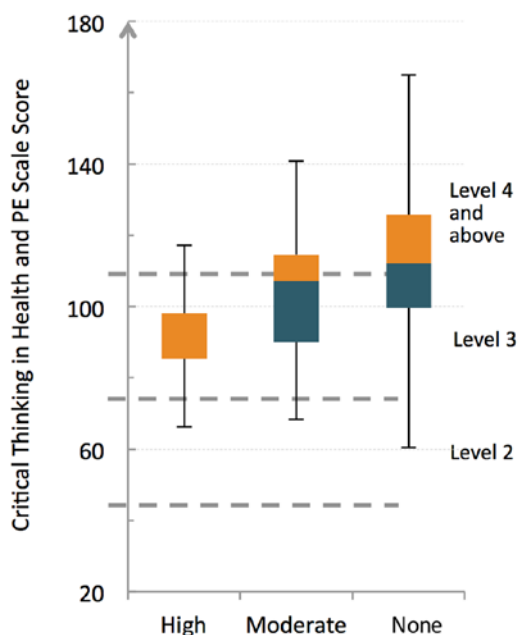


Figure 7.2 Achievement of Year 8 students with special education needs for Critical Thinking in Health and PE

Note: In Figures 7.1 and 7.2 the box and whisker plots for students with high special education needs are atypical (no whiskers in Figure 7.1, and no lower box in Figure 7.2) are due to the very small numbers of students in these categories.

Table 7.9 Difference in health and PE achievement by category of special education needs and no special education needs

	Difference between Year 4 and Year 8 on Critical Thinking in Health and PE		
	Difference (scale score units)	Effect Size	Annual Average Effect Size
High special education needs	19	*	*
Moderate special education needs	26	<b>1.41</b>	<b>0.35</b>
No special education needs	23	<b>1.13</b>	<b>0.28</b>

Effect sizes in bold are statistically significant ( $p < .05$ )

\* Effect size is not reported for the high special education group due to the small sample size

## 5. Year 4 and Year 8 student attitude to health

Figure 7.3 displays the distribution of scores on the Attitude to Health scale for Year 4 and Year 8 students across the special education needs categories. Table 7.10 reports the Year 4 and Year 8 differences in attitude scores between the year levels for these groups of students.

The average Attitude to Health score was similar for students with high and no special education needs at Year 4, and across all categories at Year 8. At Year 4, students with moderate special education needs had a slightly lower average Attitude to Health score.

In general Attitude to Health declined between Year 4 and Year 8. The decline was only statistically significant for those with no special education needs with an effect size of 0.38 (8 ssud).

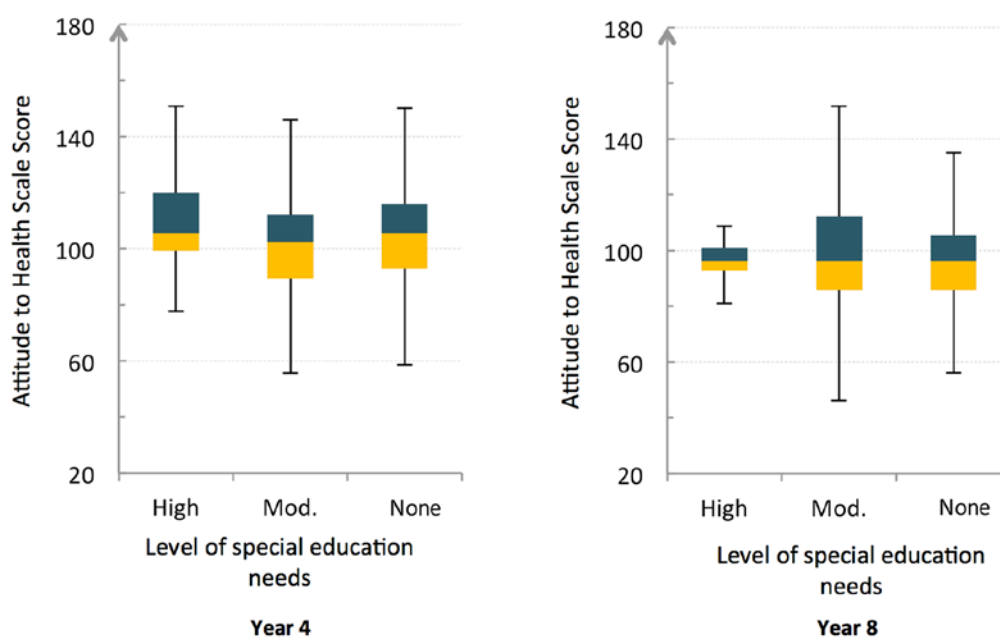


Figure 7.3 Year 4 and Year 8 student scores on Attitude to Health for different categories of special education needs (Mod=Moderate)

Table 7.10 Year 4 and Year 8 student difference in Attitude to Health for different categories of special education needs and no special education needs (SSUs = Scale score units)

		Difference between Year 4 and Year 8 on Attitude to Health				
		Average (scale score units)	SD (scale score units)	N	Difference (scale score units)	Effect Size
High special education needs	Year 4	111	23	9	*	*
	Year 8	96	9	12		
Moderate special education needs	Year 4	101	19	130	-3	-0.13
	Year 8	99	20	108		
No special education needs	Year 4	104	21	1922	-8	<b>-0.38</b>
	Year 8	96	18	1939		

Effect sizes in bold are statistically significant ( $p < .05$ )

\* Effect size is not reported for the high special education needs due to the small sample sizes

The differences are numerically correct although in some cases they may appear to differ from the averages reported in the tables due to rounding.

## 6. Year 4 and Year 8 student attitude to physical education

Figure 7.4 displays the distribution of scores on the Attitude to Physical Education scale for Year 4 and Year 8 students across the special education needs categories. Table 7.11 reports the Year 4 and Year 8 differences in attitude scale scores between the year levels for these groups.

At both year levels the average Attitude to Physical Education scores varied by only three scale score units across the three special education needs groups indicating no notable decline in Attitudes to physical education from Year 4 to Year 8.

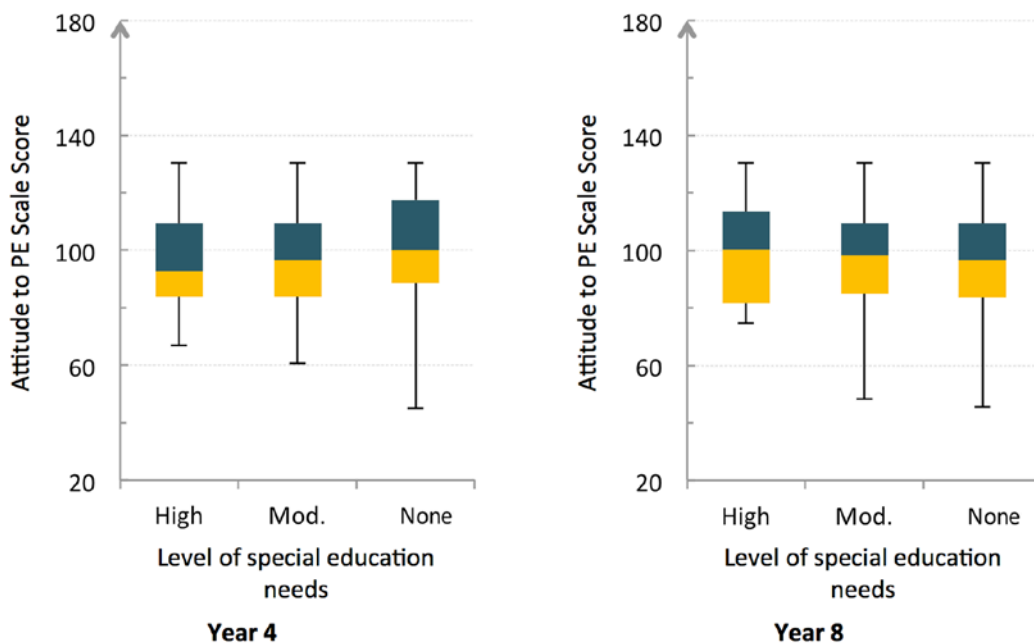


Figure 7.4 - Year 4 and Year 8 student scores on Attitude to PE for different categories of special education needs (Mod.=Moderate)



Table 7.11 Year 4 and Year 8 student difference in Attitude to PE for different categories of special education needs and no special education needs (SSUs = Scale score units)

		Difference between Year 4 and Year 8 on Attitude to PE				
		Average (scale score units)	SD (scale score units)	N	Difference (scale score units)	Effect Size
High special education needs	Year 4	97	19	10	*	*
	Year 8	100	20	12		
Moderate special education needs	Year 4	98	19	128	-1	-0.04
	Year 8	97	23	108		
No special education needs	Year 4	102	19	1923	-4	-0.19
	Year 8	98	21	1937		

Effect sizes in bold are statistically significant ( $p < .05$ )

\* Effect size is not reported for the high special education needs group due to the small sample sizes

\*\* Difference = Year 8-Year 4. The differences are numerically correct although in some cases they may appear to differ from the averages reported in the tables due to rounding

## 7. Opportunities to learn health and physical education

Students were asked to identify how often they experienced a range of health and physical education learning activities at school. The pattern and frequency of learning experiences reported by students was very similar in the groups with moderate and with no special education needs. Appendix 6 shows the distribution of responses for these two groups.

In health at Year 4, the most frequently reported opportunities to learn were ‘learning something that is important to me’ and ‘taking action to improve my health after learning something in class’, both of which were reported as occurring ‘quite a lot’ or ‘heaps’ by more than 60 percent of both moderate and no special education needs students. In Year 8 the same two opportunities were most frequently reported, but by a slightly lower proportion of students.

In physical education, at both Year 4 and Year 8, over 70 percent of students with moderate and no special education needs reported frequent opportunities to learn in all aspects except for ‘having challenges like making up movement patterns or solving problems’, where it was reported by 60 percent of students.

In general, opportunities to learn physical education were reported to occur more frequently than opportunities to learn health at both year levels and across all groups.

## 8. Benchmarking success for students with special education needs

The 2013 national average served as a benchmark for comparing the results of the different groups. It may also be used to compare health and physical education results from future cycles of NMSSA assessment. This section contrasts the profiles of Year 4 and Year 8 students with different groups of students with special education needs who scored above the benchmark on the Critical Thinking in Health and Physical Education scale at their respective year level. They are compared with the group of All Students who also scored above the respective Year 4 and Year 8 benchmarks.

Table 7.12 shows the number and percentage of Year 4 students with special education needs who scored above the Year 4 benchmark and the level and spread of their scores. At Year 4, 28 percent of students with moderate special education needs and no students with high special education needs scored above the benchmark in contrast to 53 percent of All Students.

Tables 7.13 shows the equivalent Year 8 analysis. One of the six students with high special education needs in the sample achieved above the Year 8 benchmark. Thirty-eight percent of students with moderate special education needs also achieved above the benchmark, a greater proportion than in the Year 4 sample, in contrast to 50 percent of All Students.

Table 7.12 Summary statistics for Year 4 students by categories of special education needs and All Students scoring above the Year 4 benchmark

	Year 4 students scoring above the Year 4 benchmark			
	Number above benchmark (total group)	Percentage (%) of respective group	Average* (scale score units)	SD* (scale score units)
High special education needs	0 (2)	0	101	9
Moderate special education needs	15 (53)	28		
All Students	410 (776)	53	104	11

\*The groups of students with high and moderate special education needs have been combined

Table 7.13 Summary statistics for Year 8 students by categories of special education needs and All Students scoring above the Year 8 benchmark

	Year 8 students scoring above the Year 8 benchmark			
	Number above benchmark (total group)	Percentage (%) of respective group	Average* (scale score units)	SD* (scale score units)
High special education needs	1 (6)	17	120	8
Moderate special education needs	14 (37)	38		
All Students	381 (762)	50	127	12

\*The groups of students with high and moderate special education needs have been combined

Figures 7.5 and 7.6 contrast the profiles of students with special education needs who scored above the benchmark with those of All Students, by gender, Attitude to Health, Attitude to Physical Education and school decile. At each year level the profile of above benchmark special education needs groups was created by combining the groups of students with high and moderate special education needs. This step was necessary because of the small number of students in the individual categories.

For those achieving above the benchmark at both year levels there were proportionately more boys than girls in the special education needs group. This reflects the proportion of boys and girls in the national samples of students with special needs. This contrasted with an even split for All Students achieving above the benchmark. A majority of students with special education needs scoring above the benchmark came from mid or high decile schools at Year 4 (100 percent) and Year 8 (73 percent); a similar pattern to the group of All Students.

Year 4 above benchmark students with special education needs came almost equally from mid and high decile schools. However, Tables 7.1 and 7.2 indicate that the whole sample of students with special education needs were equally spread across low, mid and high decile schools. This suggests that students with special education needs in low decile schools were under-represented in those who scored above the benchmark.

At Year 8, more than half of the students with special education needs in the sample came from mid decile schools, with the remainder coming more from low rather than high decile schools. Again, the proportion of students with special education needs attending mid decile schools scoring above the benchmark was greater than that of All Students (Table 7.2).

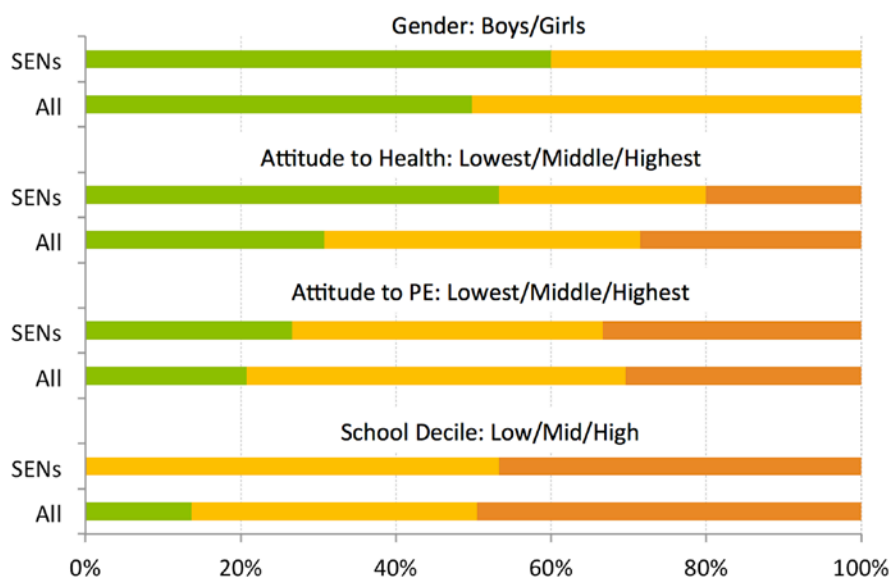


Figure 7.5 Year 4: Percentage of students with special education needs (SEN) and All Students scoring above the benchmark in Critical Thinking in Health and PE by gender, Attitude to Health, Attitude to PE, and school decile

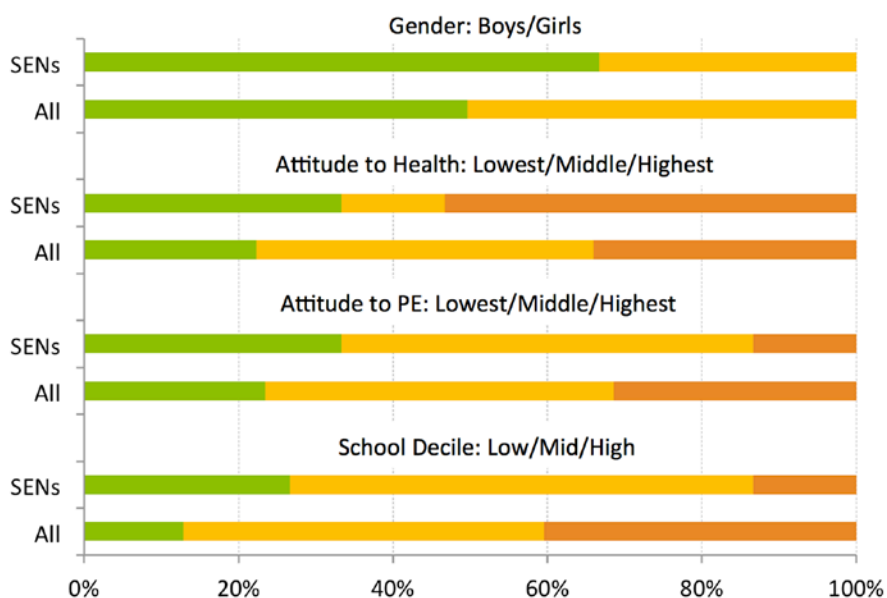


Figure 7.6 Year 8: Percentage of students with special education needs (SEN) and All Students scoring above the benchmark in Critical Thinking in Health and PE by gender, Attitude to Health, Attitude to PE, and school decile

At least 25 percent of the above benchmark special education needs group fell within the lowest Attitude to Health and Attitude to Physical Education categories at both Year 4 and Year 8. At Year 4 those with the lowest Attitude to Health made up over half of the above benchmark group. In both years and for both attitude measures the above benchmark special education needs group had a greater proportion within the lowest attitude category than the All Students group.

## 9. Inclusion of students with special education needs in health and physical education

Principals were asked to provide an overall rating of their school's inclusion of students with special education needs in the health and physical education programme. Figure 7.7 shows that over 70 percent of principals at both Year 4 and Year 8 rated their inclusion practices as very good or excellent. About 20 percent rated them as good and less than five percent at either year level rated them as fair or poor.

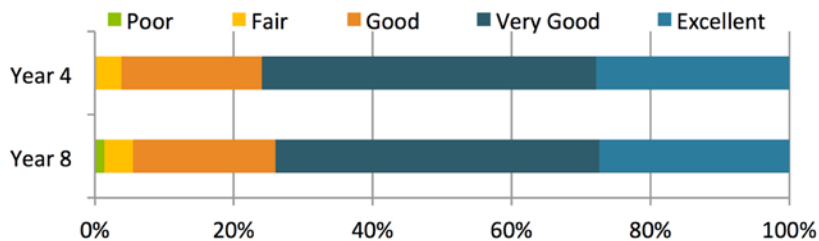


Figure 7.7 Principals' rating of their school's inclusion of students with special education needs in the health and PE programme by year level

# Appendix 1: National Monitoring Study of Student Achievement 2013

## 1. Samples for 2013

A two-stage sampling design was used to select nationally representative samples of students at Year 4 and at Year 8. The first stage involved sampling schools, and the second step involved sampling students within schools.

A stratified random sampling approach was taken with the intention of selecting 100 schools at Year 4 and 100 schools at Year 8. Twenty-eight students were randomly selected from each school with three being available as reserves. From that list 25 students made up a sample of approximately 2000 students at Year 4 and 2000 students at Year 8.

To select the Year 4 and Year 8 students for 2013, the MoE 2012 school returns for Year 3 and Year 7 respectively were used.

## 2. Sampling of schools

### Sampling algorithm

From the complete list of NZ schools select two datasets – one for Year 3 students and the other for Year 7 students.

For the Year 3 sample:

- Exclude:
  - Schools which have fewer than 8 Year 3 students
  - Private schools
  - Special schools
  - Correspondence School
  - Kura Kaupapa Māori.
- Stratify the sampling frame by region and quintile.<sup>29</sup>
- Within each region-by-quintile stratum, order the schools by Year 3 roll size.<sup>30</sup>
- Arrange the strata alternately in increasing and decreasing order of roll size.<sup>31</sup>
- Select a random starting point.
- From the random starting point, cumulate the Year 3 roll.
- Because 100 schools are required in the sample, the sampling interval is calculated as
  - Total number of Year 3 students / 100
- Assign each school to a "selection group" using this calculation:
  - Selection group = ceiling (cumulative roll/sampling interval).
- Select the first school in each selection group to form the final sample.

Follow the same process for the Year 7 sample.

<sup>29</sup> Decile 1 and 2 comprises Quintile 1; Decile 3 and 4 comprises Quintile 2; Decile 5 and 6 comprises Quintile 3; Decile 7 and 8 comprises Quintile 4; and Decile 9 and 10 comprises Quintile 5.

<sup>30</sup> Roll size refers to the year level in question e.g. roll size for Year 3 students

<sup>31</sup> This is done so that when replacements are made across stratum boundaries the replacement school is of a similar size to the one it is replacing.

If a school is selected in both the Year 3 and Year 7 samples, randomly assign it to one of the two samples. Locate the school in the unassigned sample and select a replacement school (next on list). Repeat the process for each school selected in both samples.

### The 2013 NMSSA sample

The sample frames constituted 1476 schools for Year 3 and 946 schools for Year 7 after exclusions had been applied. No schools were listed in both samples.

Selected schools were invited to participate. Those that declined to participate were substituted using the following procedure:

- from overall school sample frame, select school one row below the school withdrawn;
- verify that the substitute school is of similar type, decile, size;
- if this school is not available, re-select by going to one row above the school withdrawn. verify profile;
- if this school is not available, select school two rows below the school withdrawn. Continue in this sequence until a substitute is found.

In total, 61 schools (21 at Year 4 and 40 at Year 8) declined to participate. Replacement schools were found for all. One Year 8 school withdrew two days prior to their visit date due to school merger issues.

### The achieved samples of schools

The participation rate of schools before substitution was 83 percent at Year 4 and 71 percent at Year 8. After substitution, the achieved sample of 100 schools at Year 4 represented a participation rate<sup>32</sup> of 85 percent; and the achieved sample of 99 schools at Year 8 represented a response rate of 83 percent<sup>33</sup>.

## 3. Sampling of students

After schools agreed to participate in the programme, they were asked to provide a list of all Year 4 (or Year 8) students, identifying any students for whom the experience would be inappropriate (e.g. high special needs (ORS), very limited English language (ESOL), Māori Immersion Level 1, would be absent during the visit, had left the school, other health or behavioural issues, e.g. anxiety). The procedure for selecting students for the group-administered sample and the individual sample was as follows:

- each school provided a list of all students in their school at Year 4 or Year 8 in 2013. The lists were arranged in the order as provided by the school (that is alphabetically by last name). A computer-generated random number between 1 and 1,000,000 was assigned to each student. Students were ranked by their random number from highest to lowest;
- the first 28 non-excluded students in the ordered list were identified as belonging to the group-administered sample. The first eight students were identified as also belonging to the individual sample. Where there were more than 25 students in a year level, up to three students next on the list were selected as 'reserves' for potential replacements if required;
- the draft school lists of selected students were returned to schools for approval. Principals and teachers identified inappropriate students if they had omitted to do so at the first stage. These students were replaced with students up to number 28 from the initial rankings, resulting in a confirmed list. Letters of consent were sent to these students' parents;
- the children of parents who declined to have their child participate were withdrawn from the list.

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<sup>32</sup> School participation rate is defined as the number of schools that participated (the achieved sample) as a percentage of the number of schools required (those invited plus replacements).

- prior to the start of school visits, withdrawn students were not replaced unless they had been omitted to be identified at the first stage, in which case the student with the next rank on the school's student sample list was included. Students continued to be replaced (only if an originally selected student was withdrawn) up until two weeks prior to teacher assessors (TAs) arriving in schools to conduct the assessments. This time schedule was put in place as any later withdrawals meant we would not have had sufficient time to advise parents of substitute students;
- on the day before arrival in each school, TAs checked the final student list;
- on-site replacements of students by TAs were made if:
  - any of students 1 – 8 (the individual sample) were absent or withdrawn (e.g. by principal) on the first day, prior to the start of assessments. They were replaced according to ethnicity / gender criteria;
  - all other students (up to 28) participated in group-administered assessments. However, a maximum of 25 booklets from each school was included in the results;
  - if students were absent or withdrawn (e.g. by principal) after the start of the assessment programme, no replacements were made.

### The achieved samples of students at Year 4

Table A1.1 shows that at Year 4 the intended sample was 2173 randomly selected students. Principals identified 122 students for whom the experience would be unsuitable. The 'eligible' sample was reduced to 2051. Substitutions were selected for 63 students, and 164 students either withdrew late, were absent or made non-responses during the assessment period. The achieved group-administered sample included 2087 students representing a participation rate of 88 percent.

The achieved individual sample included 790 students representing a participation rate of 98 percent.

The combined school and student participation rates for the two samples were 74 percent and 83 percent respectively.

Table A1.2 contrasts the characteristics of the samples with the population.

Table A1.1 Selection of Year 4 students for the group-administered (GAP) and individual samples

	GAP - N	Individual - N
Intended sample of students	2173	800
Students withdrawn by principal before sample selected	122	5
Eligible sample	2051	795
Students withdrawn by parents or principal after sampling	103	5
Supplement students used	63	5
Students for whom there were no substitutes	0	-
Late withdrawals	1	-
Absences/non responses during assessment period	163	-
Achieved sample	2087	790

Table A1.2 Comparison of group-administered (GAP) and individual samples with population characteristics at Year 4

	Population (%)	Group-administered sample n = 2087* (%)	Individual sample n = 790* (%)
<b>Gender</b>			
Boys	51	51	53
Girls	49	49	47
<b>Ethnicity**</b>			
European	63	64	62
Māori	23	20	21
Pasifika	12	12	13
Asian	11	12	13
Other	3	3	3
<b>School Quintile</b>			
1-2	17	14	15
3-4	16	17	18
5-6	18	17	17
7-8	20	18	20
9-10	29	34	30
<b>School Type</b>			
Contributing (Year 1-6)	61	62	59
Full Primary (Year 1-8)	36	35	38
Composite (Year 1-13)	3	3	3
<b>MOE Region</b>			
Central North	21	22	23
Central South	18	19	19
Northern	40	39	37
Southern	21	20	21

(Note that rounding to integers means that percentages do not always add up to 100 percent)

\* Some students responses were excluded because their assessment data was not able to be used (e.g. too few questions were attempted to be able to be a reliable estimate of their achievement, or the video taped response was inaudible).

\*\* Percentages for ethnic groupings do not add to 100%. Non-prioritised ethnicity data is used throughout the NMSSA reports. Non-prioritised ethnicity data is sourced from the Ministry of Education's live enrolments database ENROL, rather than School Roll Returns



## The achieved samples of students at Year 8

Table A1.3 shows that at Year 8 the intended sample was 2500. Principals identified 165 students for whom the experience would be unsuitable. The 'eligible' sample was reduced to 2099. Substitutions were selected for 71 students, and 139 students either withdrew late, were absent or made non-responses during the period of assessment. The achieved group-administered sample included 2088 students representing a participation rate of 82 percent.

The achieved individual sample included 787 students representing a participation rate of 98 percent.

The combined school and student participation rates for the two samples were 69 percent and 81 percent respectively.

Table A1.3 Selection of Year 8 students for the group-administered (GAP) and the individual samples.

	GAP - N	Individual - N
Intended sample of students	2264	800
Students withdrawn by principal before sample selected	165	5
Eligible sample	2099	795
Students withdrawn by parents or principal after sampling	118	
Supplement students used	71	
Students for whom there were no substitutes	25*	8
Late withdrawals	5	-
Absences/non responses during assessment period	211	-
Achieved sample	2088	787

\* Late withdrawal of one school

Table A1.4 contrasts the characteristics of the samples with the population.

Table A1.4 Comparison of group-administered and individual samples with population characteristics at Year 8

	Population (%)	Group-administered sample n = 2088* (%)	Individual sample n = 787* (%)
<b>Gender</b>			
Boys	51	51	50
Girls	49	49	50
<b>Ethnicity**</b>			
European	61	62	60
Māori	22	23	25
Pasifika	12	13	13
Asian	10	8	13
Other	3	2	3
<b>School Quintile</b>			
1-2	14	15	16
3-4	16	16	16
5-6	24	28	27
7-8	21	16	16
9-10	24	26	24
<b>School Type</b>			
Full Primary (Year 1-8)	34	36	38
Intermediate	47	46	44
Secondary (Year 7-13)	13	14	13
Composite (Year 1-13 & 7-10)	5	4	5
<b>MOE Region</b>			
Central North	22	22	23
Central South	18	16	16
Northern	38	38	37
Southern	22	24	23

(Note that rounding to integers means that percentages do not always add up to 100 percent)

\* Some student responses were excluded because their assessment data was not able to be used (e.g. too few questions were attempted to be able to be a reliable estimate of their achievement, or the video taped response was inaudible).

\*\* Percentages for ethnic groupings do not add to 100%. Non-prioritised ethnicity data is used throughout the NMSSA reports. Non-prioritised ethnicity data is sourced from the Ministry of Education's live enrolments database ENROL, rather than School Roll Returns.

## 4. Investigating weighting the NMSSA 2013 sample

A post-hoc investigation was carried out to determine whether or not weights should be applied to the NMSSA 2013 sample.

Sample weights can be used to correct for misrepresentation in the sample. In NMSSA 2013 weights were calculated with respect to gender, decile (represented by quintile), and ethnicity. Non-prioritised ethnicity variables were used. That is, each sample member's ethnicity was denoted by five binary variables, with the possibility of identifying with multiple groups.

For each sample member five weights (one for each possible ethnic identification) were calculated as:

- $P_N(\text{gender}) * P_N(\text{quintile}) * P_N(\text{ethnic group}) / P_S(\text{gender}) * P_S(\text{quintile}) * P_S(\text{ethnic group})$
- where ethnic group could be one of NZ European, Māori, Pasifika, Asian, and Other

The subscripts 'N' and 'S' denote national level probabilities and sample probabilities respectively.

A final weight, taking the average of the five weights was applied.

### Distribution of final weights

Table A1.5 shows the distribution of final weights for each sample.

Table A1.5 - Distribution of final weights for each sample

Final weights		
	Year 4	Year 8
Average	1.00	1.00
Minimum	0.86	0.82
25th percentile	0.89	0.88
50th percentile	0.96	0.92
75th percentile	1.09	1.09
Maximum	1.23	1.43

There were no extreme weights, and the distributions for both year level samples are reasonably closely clustered around 1.00. This indicates that in general the selected sample was representative of the national population. A decision was taken not to apply weights to these samples.

## Appendix 2: Assessment Framework for the NMSSA Health and Physical Education Programme

Task Title	Strand	Key Learning Area	Sub/constructs	Assessment Approach
<b>An Important Message*</b>	Healthy Communities & Environments	Body Care & Physical Safety	Critical thinking Critical action Creative thinking	Paper-and-pencil/ Interview
<b>Water Safety*</b>	Personal Health & Physical Development Healthy Communities & Environments	Body Care & Physical Safety Outdoor Education	Critical thinking Critical action	Interview
<b>New School*</b>	Relationships with other People	Mental Health Sexuality	Critical thinking Creative thinking	Interview
<b>Magazine Ads*</b>	Personal Health & Physical Development	Mental Health Sexuality Body Care & Physical Safety	Critical thinking	Interview
<b>Fair Play*</b>	Relationships with other People	Mental Health Sports Studies	Critical thinking Critical action	Interview
<b>Eating Together*</b>	Personal Health and Physical Development Healthy Communities & Environments	Food and Nutrition	Critical thinking Creative thinking	Interview
<b>Rippa Tag* (1 item)**</b>	Movement Concepts & Motor Skills	Physical Activity	Critical thinking Creative thinking	Activity
<b>Rua Tapawhā***</b>	Movement Concepts & Motor Skills Relationships with other People	Physical Activity	Critical thinking Critical action Creative thinking	Activity/Interview
<b>Movement Sequences****</b>	Movement Concepts & Motor Skills	Physical Activity	Fundamental movement skills	Activity
<b>Well-being*****</b>	Personal Health & Physical Development Movement concepts and Motor Skills	Mental Health Physical Activity	Critical thinking Critical action	Paper-and-pencil/ Interview

\* Formed the scale of Critical Thinking in Health and Physical Education

\*\* Movement Skills including (but not limited to) rotation, agility, and balance, along with strategic action skills

\*\*\* Movement Skills including (but not limited to) throwing, catching, defensive tracking, and strategic action skills

\*\*\*\* Movement Skills including (but not limited to) control of equipment, change of level and pace, use of body and space

\*\*\*\*\* Understanding of Well-being

## Appendix 3:

# Curriculum Alignment of the Critical Thinking in Health and Physical Education Scale

A curriculum alignment exercise was carried out for the part of the health and physical education assessment that addressed critical thinking in health and physical education. An achievement scale (Critical Thinking in Health and Physical Education) was constructed using students' responses to interview questions designed to probe their ability to think critically within a variety of contexts.

The alignment of an achievement scale with health and physical education in the NZC has not been attempted before. Consequently, the process for NMSSA 2013 involved some experimentation and some trial and error. Thorough discussions with experts in the field were held about the nature of the learning area and how it can be interpreted, how the learning area is presented to students at school, and what student achievement looks like in this learning area.

A panel of subject matter experts came together for a day's workshop to study and discuss the interview tasks, the scoring 'rubrics, and students' responses in detail. The concept of 'minimal competence' at particular curriculum levels was also discussed at length.

Panel members were asked to think about what students who were achieving at a minimal curriculum level of 2 (or 4) would be able to achieve on each NMSSA task. This part of the alignment relied on the panel members being very familiar, in a practical sense, with students' learning in health and physical education, and understanding the sorts of competencies students at this level would be able to exhibit in the NMSSA assessment.

For each of the tasks involved, each panel member answered the question:

- What would a minimally competent student at Level 2 (or 4) score on this task?

From the panel's answers to this question a 'profile' of the minimally competent student could be built up, and finally converted to a scale score.

There were some challenges for the panel in completing this exercise:

- The NZC in health and physical education provides rather broad descriptions of achievement. Specific contexts for study are not provided, and descriptions of developing skills sets at different levels are open to interpretation.
- Unlike other aspects of learning areas (such as reading, writing, and mathematics) health and physical education is often presented in short units of learning contexts, and not as an everyday learning contexts. Students may only be assessed with respect to the learning area after a year's worth of experiences in health and physical education.
- Panel members noted that classroom assessment in health and physical education would often be associated with a short unit of learning contexts, and an ensuing assessment would be generally relevant to students' recent experiences. In the NMSSA interview situation, students were presented with contexts they might or might not have been recently exposed to.

There were also some challenges for students in the interview assessment:

- The interview questions were, of necessity, less relevant than they would have been if they had been related to a recent classroom context for learning.
- Students were required to answer questions on the spot. There was little time for discussion, and opportunities for prompting were limited because of time allocations. There were limited opportunities for students to consider, or re-consider, responses to questions.
- Students were interacting on a one-to-one basis with an unfamiliar person. It is not uncommon for students to be assessed in a group situation in a classroom environment - a class discussion for instance. Some students may have found the one-to-one mode of assessment difficult.

Given the difficulties in interpretation of the NZC and the difficulty in applying the concept of 'minimal competence' in this learning area, a second session was organised to confirm the first alignment. After careful deliberation some adjustments were made to the initial alignment to render the final result for NMSSA 2013, shown in Table A3.1. It is important to regard these results as point estimates with inherent error. However, it is impossible to assess the precise amount of error involved. As a consequence, graphics in the report have been presented with shading around curriculum cut-points to remind the reader that substantial error could be involved.

The point estimates for curriculum cut-points will stand in good stead to be used for comparative purposes in the next NMSSA cycle involving health and physical education.

Table A3.1: Final cut-off score points out the Critical Thinking in Health and PE scale

	Critical Thinking in Health and PE scale location
Level 2	43.1
Level 3	76.4
Level 4	109.8

## Appendix 4: Sub-group Analyses Summary

Note: Effect sizes and the confidence intervals are directional; that is, they are either negative or positive. The direction of the effect sizes reported in this appendix may differ from what is reported in the tables in the body of the report. In the body of the report and in the appendices the sign of any effect size can be interpreted by using the contextual information provided with it. For example, in Table 1.2 of this appendix the effect size for the difference in Year 4 average scale scores for students in low vs mid decile groups (Low/Mid) is reported as 0.60. Students in low decile schools scored lower than students in mid decile schools (77 vs 89). The effect size reported in Table 3.4 of Chapter 3 reports it as -.60.

## Effect Sizes Analyses

- 1 All Students
  - 1.1 Year 4 All Students: Sub-group means, standards deviations and sample sizes.
  - 1.2 Year 4 All Students: Sub-group effect sizes and confidence intervals
  - 1.3 Year 8 All Students: Sub-group means, standards deviations and sample sizes
  - 1.4 Year 8 All Students: Sub-group effect sizes and confidence intervals
  - 1.5 Year 8/Year 4 All students: Sub-group means, standards deviations and sample sizes
  - 1.6 Year 8/Year 4 All Students: Differences, effect sizes and confidence intervals
2. Māori Students
  - 2.1 Year 4 Māori Students: Sub-group means, standards deviations and sample sizes
  - 2.2 Year 4 Māori Students: Sub-group effect sizes and confidence intervals
  - 2.3 Year 8 Māori Students: Sub-group means, standards deviations and sample sizes
  - 2.4 Year 8 Māori Students: Sub-group effect sizes and confidence intervals
  - 2.5 Year 8/Year 4 Māori Students: Sub-group means, standards deviations and sample sizes
  - 2.6 Year 8/Year 4 Māori Students: Differences, effect sizes and confidence intervals
3. Pasifika Students
  - 3.1 Year 4 Pasifika Students: Sub-group means, standards deviations and sample sizes
  - 3.2 Year 4 Pasifika Students: Sub-group effect sizes and confidence intervals
  - 3.3 Year 8 Pasifika Students: Sub-group means, standards deviations and sample sizes
  - 3.4 Year 8 Pasifika Students: Sub-group effect sizes and confidence intervals
  - 3.5 Year 8/Year 4 Pasifika Students: Sub-group means, standards deviations and sample sizes
  - 3.6 Year 8/Year 4 Pasifika Students: Differences, effect sizes and confidence intervals
4. Special Education Needs (SEN) Students
  - 4.1 Year 4 Special Education Needs Students: Means, standards deviations and sample sizes.
  - 4.2 Year 4 Special Education Needs Students: Sub-group effect sizes and confidence intervals.
  - 4.3 Year 8 Special Education Needs Students: Means, standards deviations and sample sizes
  - 4.4 Year 8 Special Education Needs Students: Sub-group effect sizes and confidence intervals
  - 4.5 Year 8/Year 4 Special Education Needs Students: Differences, effect sizes and confidence intervals
5. Achievement in Health by Opportunities to Learn Statements
  - 5.1 Year 4 responses to Health Opportunities Learn statements: Means, Standard deviations, Ns
  - 5.2 Year 4 responses to Health Opportunities to Learn statements: Sub-group effect sizes and confidence intervals
  - 5.3 Year 8 responses to Health Opportunities to Learn statements: Means, Standard deviations, Ns
  - 5.4 Year 8 responses to Health Opportunities to Learn statements: Sub-group effect sizes and confidence intervals
6. Achievement in PE by Opportunities to Learn statements
  - 6.1 Year 4 responses to PE Opportunities to Learn statements: Means, Standard deviations, Ns
  - 6.2 Year 4 responses to PE Opportunities to Learn statements: Sub-group effect sizes and confidence intervals
  - 6.3 Year 8 responses to PE Opportunities to Learn statements: Means, Standard deviations, Ns
  - 6.4 Year 8 responses to PE Opportunities to Learn statements: Sub-group effect sizes and confidence intervals



## 1. All Students

Table A4.1.1 Year 4 All Students: Sub-group means, standards deviations and sample sizes

Variable		Critical Thinking in Health and PE				Attitude to Health				Attitude to PE			
		Boys	Girls			Boys	Girls			Boys	Girls		
Gender	Mean	87	90			100	108			103	100		
	SD	21	19			23	19			19	18		
	N	414	362			1046	1021			1046	1021		
Ethnicity		NZ European	Māori	Pasifika	Asian	European	Māori	Pasifika	Asian	European	Māori	Pasifika	Asian
	Mean	93	83	75	89	102	105	109	103	102	103	101	98
	SD	18	20	19	22	22	20	19	21	19	19	19	19
	N	483	162	98	93	1321	422	254	248	1322	421	254	248
Ethnicity		Non-NZ Euro	Non-Māori	Non-Pasifika	Non-Asian								
	Mean	81	90	91	89								
	SD	22	20	20	20								
	N	293	614	678	683								
School Decile		Low	Mid	High		Low	Mid	High		Low	Mid	High	
	Mean	77	89	95		106	104	102		100	103	102	
	SD	21	19	18		21	22	21		19	19	18	
	N	185	275	316		461	709	897		458	711	898	
School Type		Contributing	Full Primary			Contributing	Full Primary			Contributing	Full Primary		
	Mean	90	87			103	103			102	102		
	SD	20	20			21	21			19	19		
	N	455	298			1287	723			1287	723		
Attitude to Health		Lowest	Middle	Highest									
	Mean	89	88	89									
	SD	18	21	22									
	N	233	317	216									
Attitude to PE		Lowest	Middle	Highest									
	Mean	84	91	90									
	SD	22	20	19									
	N	193	343	227									

Table A4.1.2 Year 4 All Students: Sub-group effect sizes and confidence intervals

		Critical Thinking in Health and PE			
Variable	Comparison	Boys/Girls			
Gender	Upper	0.34			
	Effect Size	0.16			
	Lower	-0.01			
	<b>Comparison</b>	<b>NZ European/Non-NZ European</b>	<b>Māori/Non-Māori</b>	<b>Pasifika/Non-Pasifika</b>	<b>Asian/Non-Asian</b>
Ethnicity	Upper	-0.45	0.57	1.07	0.27
	Effect Size	-0.64	0.35	0.80	0.00
	Lower	-0.82	0.14	0.54	-0.27
	<b>Comparison</b>	<b>Low/Mid</b>	<b>Mid/High</b>	<b>Low/High</b>	
School Decile	Upper	0.84	0.50	1.15	
	Effect Size	0.60	0.30	0.92	
	Lower	0.36	0.10	0.68	
	<b>Comparison</b>	<b>Contributing/Full Primary</b>			
School Type	Upper	0.32			
	Effect Size	0.14			
	Lower	-0.04			
	<b>Comparison</b>	<b>Lowest/Middle</b>	<b>Middle/Highest</b>	<b>Lowest/Highest</b>	
Attitude to Health	Upper	<b>0.20</b>	<b>0.23</b>	<b>0.24</b>	
	Effect Size	<b>-0.01</b>	<b>0.02</b>	<b>0.01</b>	
	Lower	<b>-0.22</b>	<b>-0.20</b>	<b>-0.22</b>	
	<b>Comparison</b>	<b>Lowest/Middle</b>	<b>Middle/Highest</b>	<b>Lowest/Highest</b>	
Attitude to PE	Upper	0.56	0.20	0.57	
	Effect Size	0.33	-0.01	0.32	
	Lower	0.11	-0.22	0.08	

Table A4.1.3 Year 8 All Students: Sub-group means, standards deviations and sample sizes

Variable	Critical Thinking in Health and PE				Attitude to Health				Attitude to PE				
	Boys	Girls			Boys	Girls			Boys	Girls			
Gender	Mean	112	111		95	98			103	94			
	SD	19	21		19	18			20	21			
	N	378	384		1055	1011			1056	1008			
Ethnicity		NZ European	Māori	Pasifika	Asian	European	Māori	Pasifika	Asian	European	Māori	Pasifika	Asian
	Mean	116	108	97	111	96	95	99	99	97	102	105	89
	SD	19	17	21	17	18	19	19	19	21	21	20	18
	N	455	188	101	61	1288	480	276	164	1288	480	275	163
Ethnicity		Non-NZ Euro	Non-Māori	Non-Pasifika	Non-Asian								
	Mean	104	113	114	111								
	SD	19	20	19	20								
	N	307	574	661	701								
School Decile		Low	Mid	High		Low	Mid	High		Low	Mid	High	
	Mean	101	111	120		98	96	95		102	98	97	
	SD	20	18	19		19	19	18		21	22	20	
	N	163	361	238		403	989	674		402	989	673	
School Type		Full Primary	Composite				Composite			Full Primary	Composite		
	Mean	110	107			96	97			98	99		
	SD	20	18			19	15			22	19		
	N	291	39			747	89			745	89		
		Intermediate	Secondary			Intermediate	Secondary			Intermediate	Secondary		
	Mean	112	114			97	96			98	99		
	SD	20	18			18	18			21	19		
N	331	101			940	290			940	290			
Attitude to Health		Lowest	Middle	Highest									
	Mean	108	111	115									
	SD	18	20	21									
	N	206	326	217									
Attitude to PE		Lowest	Middle	Highest									
	Mean	110	111	113									
	SD	20	20	19									
	N	193	323	232									

Table A4.1.4 Year 8 All Students: Sub-group effect sizes and confidence intervals

		Critical Thinking in Health and PE			
Variable	Comparison	Boys/Girls			
Gender	Upper	0.15			
	Effect Size	-0.02			
	Lower	-0.20			
	Comparison	NZ European/Non-NZ European	Māori/Non-Māori	Pasifika/Non-Pasifika	Asian/Non-Asian
Ethnicity	Upper	-0.45	0.45	1.17	0.33
	Effect Size	-0.63	0.25	0.90	0.01
	Lower	-0.81	0.04	0.64	-0.32
	Comparison	Low/Mid	Mid/High	Low/High	
School Decile	Upper	0.74	0.69	1.21	
	Effect Size	0.50	0.49	0.95	
		0.27	0.28	0.69	
	Comparison	Full Primary/Intermediate	Intermediate/Secondary	Full Primary/Secondary	
School Type	Upper	0.27	0.40	0.49	
	Effect Size	0.08	0.12	0.21	
	Lower	-0.12	-0.15	-0.07	
	Comparison	Lowest/Middle	Middle/Highest	Lowest/Highest	
Attitude to Health	Upper	0.37	0.41	0.59	
	Effect Size	0.15	0.20	0.35	
	Lower	-0.07	-0.02	0.11	
	Comparison	Lowest/Middle	Middle/Highest	Lowest/Highest	
Attitude to PE	Upper	0.29	0.29	0.39	
	Effect Size	0.06	0.08	0.15	
	Lower	-0.16	-0.13	-0.08	

Table A4.1.5 Year 8/Year 4 All students: Sub-group means, standards deviations and sample sizes

		Critical Thinking in Health and PE		Attitude to Health		Attitude to PE	
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
All Students	Mean	89	111	104	96	102	98
	SD	20	20	21	19	19	21
	N	776	762	2067	2066	2067	2064
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Gender - Boys	Mean	87	112	100	95	103	103
	SD	21	19	23	19	19	20
	N	414	378	1046	1055	1046	1056
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Gender - Girls	Mean	90	111	108	98	100	94
	SD	19	21	19	18	18	21
	N	362	384	1021	1011	1021	1008
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Ethnicity - European	Mean	93	116	102	96	102	97
	SD	18	19	22	18	19	21
	N	483	455	1321	1288	1322	1288
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Ethnicity - Māori	Mean	83	108	105	95	103	102
	SD	20	17	20	19	19	21
	N	162	188	422	480	421	480
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Ethnicity - Pasifika	Mean	75	97	109	99	101	105
	SD	19	21	19	19	19	20
	N	98	101	254	276	254	275
		Year 4	Year 8				
Ethnicity - Asian	Mean	89	111				
	SD	22	17				
	N	93	61				

		Critical Thinking in Health and PE		Attitude to Health		Attitude to PE	
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Decile - Low	Mean	77	101	106	98	100	102
	SD	21	20	21	19	19	21
	N	185	163	461	403	458	402
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Decile - Mid	Mean	89	111	104	96	103	98
	SD	19	18	22	19	19	22
	N	275	361	709	989	711	989
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Decile - High	Mean	95	120	102	95	102	97
	SD	18	19	21	18	18	20
	N	316	238	897	674	898	673

Table A4.1.6 Year 8/Year 4 All Students: Differences, effect sizes and confidence intervals

		Critical Thinking in Health and PE			Attitude to Health		Attitude to PE	
Comparison		All			All		All	
All Students	Upper	1.27			-0.29		-0.10	
	Effect Size	1.14			-0.36		-0.18	
	Lower	1.00			-0.44		-0.25	
Comparison		Boys	Girls		Boys	Girls	Boys	Girls
Gender	Upper	1.41	1.23		-0.14	-0.40	0.08	-0.23
	Effect Size	1.23	1.04		-0.24	-0.51	-0.03	-0.34
	Lower	1.04	0.85		-0.35	-0.62	-0.13	-0.45
Comparison		NZ European	Māori	Pasifika				
Ethnicity	Upper	1.43	1.64	1.46				
	Effect Size	1.25	1.35	1.08				
	Lower	1.08	1.06	0.71				
Comparison		Asian						
Ethnicity	Upper	1.55						
	Effect Size	1.12						
	Lower	0.68						
Comparison		Low	Mid	High				
Decile	Upper	1.44	1.37	1.60				
	Effect Size	1.16	1.16	1.37				
	Lower	0.87	0.95	1.14				

## 2. Māori Students

Table A4.2.1 Year 4 Māori Students: Sub-group means, standards deviations and sample sizes

Variable		Critical Thinking in Health and PE			Attitude to Health			Attitude to PE		
		Boys	Girls		Boys	Girls		Boys	Girls	
Gender	Mean	82	84		101	108		103	103	
	SD	21	18		21	18		19	19	
	N	86	76		222	200		221	200	
		Low	Mid	High	Low	Mid	High	Low	Mid	High
School Decile	Mean	77	86	91	105	104	105	102	103	105
	SD	21	18	16	21	19	20	19	18	19
	N	75	56	31	169	162	91	166	163	92
		Contributing	Full Primary		Contributing	Full Primary		Contributing	Full Primary	
School Type	Mean	83	83		104	106		103	104	
	SD	20	21		21	19		19	19	
	N	97	59		272	140		270	141	
		Lowest	Middle	Highest						
Attitude to Health	Mean	88	82	80						
	SD	16	20	23						
	N	40	66	54						
		Lowest	Middle	Highest						
Attitude to PE	Mean	78	87	84						
	SD	20	19	20						
	N	43	57	58						



Table A4.2.2 Year 4 Māori Students: Sub-group effect sizes and confidence intervals

Critical Thinking in Health and PE				
Variable	Comparison	Boys/Girls		
Gender	Upper	0.47		
	Effect Size	0.09		
	Lower	-0.30		
	Comparison	Low/Mid	Mid/High	Low/High
School Decile	Upper	0.88	0.84	1.22
	Effect Size	0.44	0.29	0.68
	Lower	0.00	-0.27	0.14
	Comparison	Contributing/Full Primary		
School Type	Upper	0.39		
	Effect Size	-0.02		
	Lower	-0.42		
	Comparison	Lowest/Middle	Middle/Highest	Lowest/Highest
Attitude to Health	Upper	0.21	0.35	0.15
	Effect Size	-0.29	-0.10	-0.37
	Lower	-0.78	-0.56	-0.89
	Comparison	Lowest/Middle	Middle/Highest	Lowest/Highest
Attitude to PE	Upper	0.96	0.34	0.83
	Effect Size	0.46	-0.12	0.33
	Lower	-0.05	-0.58	-0.17

Table A4.2.3 Year 8 Māori Students: Sub-group means, standards deviations and sample sizes

Variable		Critical Thinking in Health and PE			Attitude to Health			Attitude to PE		
		Boys	Girls		Boys	Girls		Boys	Girls	
Gender	Mean	108	107		94	97		106	98	
	SD	15	19		19	19		19	22	
	N	102	86		256	224		256	224	
		Low	Mid	High	Low	Mid	High	Low	Mid	High
School Decile	Mean	104	108	117	97	95	96	103	103	96
	SD	14	18	17	18	20	19	22	21	18
	N	66	95	27	158	254	68	158	254	68
		Full Primary	Composite		Full Primary	Composite		Full Primary	Composite	
School Type	Mean	111	103		99	98		102	105	
	SD	16	14		18	18		22	18	
	N	72	17		164	38		164	38	
		Intermediate	Secondary		Intermediate	Secondary		Intermediate	Secondary	
	Mean	105	113		94	91		102	102	
	SD	18	18		20	19		21	16	
	N	86	13		242	36		242	36	
		Lowest	Middle	Highest						
Attitude to Health	Mean	107	106	114						
	SD	16	16	18						
	N	71	74	40						
		Lowest	Middle	Highest						
Attitude to PE	Mean	103	110	108						
	SD	17	17	17						
	N	43	72	70						

Table A4.2.4 Year 8 Māori Students: Sub-group effect sizes and confidence intervals

		Critical Thinking in Health and PE		
Variable	Comparison	Boys/Girls		
Gender	Upper	0.33		
	Effect Size	-0.03		
	Lower	-0.39		
	Comparison	Low/Mid	Mid/High	Low/High
School Decile	Upper	0.60	1.05	1.39
	Effect Size	0.21	0.51	0.80
	Lower	-0.19	-0.03	0.22
	Comparison	Full Primary/Intermediate	Intermediate/Secondary	Full Primary/Secondary
School Type	Upper	0.06	1.17	0.88
	Effect Size	-0.33	0.44	0.13
	Lower	-0.73	-0.30	-0.61
	Comparison	Lowest/Middle	Middle/Highest	Lowest/Highest
Attitude to Health	Upper	0.36	0.99	0.95
	Effect Size	-0.05	0.50	0.46
	Lower	-0.46	0.01	-0.04
	Comparison	Lowest/Middle	Middle/Highest	Lowest/Highest
Attitude to PE	Upper	0.89	0.32	0.79
	Effect Size	0.41	-0.10	0.31
	Lower	-0.07	-0.51	-0.17

Table A4.2.5 Year 8/Year 4 Māori Students: Sub-group means, standards deviations and sample sizes

		Critical Thinking in Health and PE		Attitude to Health		Attitude to PE	
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
All Students	Mean	83	108	105	95	103	102
	SD	20	17	20	19	19	21
	N	162	188	422	480	421	480
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Gender - Boys	Mean	82	108	101	94	103	106
	SD	21	15	21	19	19	19
	N	86	102	222	256	221	256
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Gender - Girls	Mean	84	107	108	97	103	98
	SD	18	19	18	19	19	22
	N	76	86	200	224	200	224
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Decile - Low	Mean	77	104	105	97	102	103
	SD	21	14	21	18	19	22
	N	75	66	169	158	166	158
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Decile - Mid	Mean	86	108	104	95	103	103
	SD	18	18	19	20	18	21
	N	56	95	162	254	163	254
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Decile - High	Mean	91	117	105	96	105	96
	SD	16	17	20	19	19	18
	N	31	27	91	68	92	68

Table A4.2.6 Year 8/Year 4 Māori Students: Differences, effect sizes and confidence intervals

		Critical Thinking in Health and PE			Attitude to Health		Attitude to PE	
Comparison		All			All		All	
All Students	Upper	1.58			-0.31		0.10	
	Effect Size	1.35			-0.47		-0.07	
	Lower	1.12			-0.64		-0.23	
Comparison		Boys	Girls		Boys	Girls	Boys	Girls
Gender	Upper	1.82	1.69		-0.15	-0.36	0.36	-0.04
	Effect Size	1.42	1.27		-0.37	-0.60	0.14	-0.28
	Lower	1.02	0.84		-0.60	-0.85	-0.09	-0.52
Comparison		Low	Mid	High				
Decile	Upper	1.92	1.67	2.29				
	Effect Size	1.46	1.22	1.54				
	Lower	0.99	0.78	0.78				

### 3. Pasifika Students

Table A4.3.1 Year 4 Pasifika Students: Sub-group means, standards deviations and sample sizes

		Critical Thinking in Health and PE			Attitude to Health			Attitude to PE		
Variable		Boys	Girls		Boys	Girls		Boys	Girls	
Gender	Mean	72	79		105	113		102	101	
	SD	21	16		20	16		19	19	
	N	57	41		141	113		141	113	
		Low	Mid	High	Low	Mid	High	Low	Mid	High
School Decile	Mean	72	76	94	109	106	113	98	108	107
	SD	19	20	11	17	22	24	19	18	19
	N	64	25	9	169	56	29	169	56	29
		Contributing	Full Primary		Contributing	Full Primary		Contributing	Full Primary	
School Type	Mean	77	72		109	108		102	100	
	SD	21	17		19	19		19	19	
	N	55	43		145	106		145	106	
		Lowest	Middle	Highest						
Attitude to Health	Mean	71	74	77						
	SD	20	20	18						
	N	19	40	37						
		Lowest	Middle	Highest						
Attitude to PE	Mean	63	78	79						
	SD	24	18	14						
	N	23	47	26						

Table A4.3.2 Year 4 Pasifika Students: Sub-group effect sizes and confidence intervals

		Critical Thinking in Health and PE		
Variable	Comparison	Boys/Girls		
Gender	Upper	0.90		
	Effect Size	0.39		
	Lower	-0.12		
	Comparison	Low/Mid	Mid/High	Low/High
School Decile	Upper	0.84	2.02	2.19
	Effect Size	0.25	0.98	1.26
	Lower	-0.33	-0.06	0.34
	Comparison	Contributing/Full Primary		
School Type	Upper	0.80		
	Effect Size	0.29		
	Lower	-0.21		
	Comparison	Lowest/Middle	Middle/Highest	Lowest/Highest
Attitude to Health	Upper	0.87	0.71	1.04
	Effect Size	0.17	0.14	0.33
	Lower	-0.53	-0.42	-0.38
	Comparison	Lowest/Middle	Middle/Highest	Lowest/Highest
Attitude to PE	Upper	1.40	0.70	1.60
	Effect Size	0.75	0.09	0.85
	Lower	0.09	-0.52	0.09

Table A4.3.3 Year 8 Pasifika Students: Sub-group means, standards deviations and sample sizes

Variable		Critical Thinking in Health and PE			Attitude to Health			Attitude to PE		
		Boys	Girls		Boys	Girls		Boys	Girls	
Gender	Mean	98	96		97	101		108	101	
	SD	18	23		20	18		20	19	
	N	47	54		146	130		146	129	
		Low	Mid	High	Low	Mid	High	Low	Mid	High
School Decile	Mean	94	101	107	98	102	96	105	105	108
	SD	22	16	23	21	17	12	20	19	18
	N	66	30	5	180	71	25	179	71	25
		Full Primary	Composite		Full Primary	Composite		Full Primary	Composite	
School Type	Mean	98	-		96	-		102	-	
	SD	20	-		23	-		20	-	
	N	56	-		137	-		136	-	
		Intermediate	Secondary		Intermediate	Secondary		Intermediate	Secondary	
	Mean	95	96		102	99		108	106	
	SD	22	22		15	14		18	19	
	N	36	8		111	26		111	26	
		Lowest	Middle	Highest						
Attitude to Health	Mean	94	95	99						
	SD	16	22	21						
	N	22	36	41						
		Lowest	Middle	Highest						
Attitude to PE	Mean	94	93	101						
	SD	20	23	17						
	N	14	44	41						



Table A4.3.4 Year 8 Pasifika Students: Sub-group effect sizes and confidence intervals

		Critical Thinking in Health and PE		
Variable	Comparison	Boys/Girls		
Gender	Upper	0.38		
	Effect Size	-0.11		
	Lower	-0.61		
	Comparison	Low/Mid	Mid/High	Low/High
School Decile	Upper	0.91	1.57	1.76
	Effect Size	0.37	0.33	0.60
	Lower	-0.18	-0.90	-0.56
	Comparison	Full Primary/Intermediate	Intermediate/Secondary	Full Primary/Secondary
School Type	Upper	0.41	1.04	0.88
	Effect Size	-0.12	0.05	-0.06
	Lower	-0.64	-0.94	-1.01
	Comparison	Lowest/Middle	Middle/Highest	Lowest/Highest
Attitude to Health	Upper	0.74	0.72	0.90
	Effect Size	0.06	0.16	0.23
	Lower	-0.62	-0.41	-0.43
	Comparison	Lowest/Middle	Middle/Highest	Lowest/Highest
Attitude to PE	Upper	0.76	0.90	1.18
	Effect Size	0.00	0.35	0.40
	Lower	-0.77	-0.19	-0.38

Table A4.3.5 Year 8/Year 4 Pasifika Students: Sub-group means, standards deviations and sample sizes

		Critical Thinking in Health and PE		Attitude to Health		Attitude to PE	
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
All Students	Mean	75	97	109	99	101	105
	SD	19	21	19	19	19	20
	N	98	101	254	276	254	275
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Gender - Boys	Mean	74	100	105	97	102	108
	SD	15	20	20	20	19	20
	N	57	47	141	146	141	146
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Gender - Girls	Mean	71	98	113	101	101	101
	SD	12	19	16	18	19	19
	N	43	56	113	130	113	129
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Decile - Low	Mean	69	95	109	98	98	105
	SD	12	18	17	21	19	20
	N	65	66	169	180	169	179
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Decile - Mid	Mean	76	102	106	102	108	105
	SD	14	18	22	17	18	19
	N	26	31	56	71	56	71
		Year 4	Year 8	Year 4	Year 8	Year 4	Year 8
Decile - High	Mean	86	123	113	96	107	108
	SD	15	27	24	12	19	18
	N	9	6	29	25	29	25

Table A4.3.6 Year 8/Year 4 Pasifika Students: Differences, effect sizes and confidence intervals

		Critical Thinking in Health and PE			Attitude to Health		Attitude to PE	
Comparison		All			All		All	
All Students	Upper	1.38			-0.29		0.41	
	Effect Size	1.08			-0.51		0.20	
	Lower	0.78			-0.72		-0.01	
Comparison		Boys	Girls		Boys	Girls	Boys	Girls
Gender	Upper	1.86	1.34		-0.09	-0.39	0.64	0.35
	Effect Size	1.32	0.81		-0.38	-0.71	0.35	0.03
	Lower	0.78	0.27		-0.68	-1.04	0.06	-0.28
Comparison		Low	Mid	High				
Decile	Upper	1.55	2.14	2.40				
	Effect Size	1.09	1.38	0.79				
	Lower	0.63	0.62	-0.81				

## 4. Special Education Needs (SEN) Students

Table A4.4.1 Year 4 Special Education Needs Students: Means, standards deviations and sample sizes

Variable		Critical Thinking in Health and PE				Attitude to Health				Attitude to PE			
		High	Mod.	On Ref.	No	High	Mod.	On Ref.	No	High	Mod.	On Ref.	No
SENS Level	Mean	-	78	-	89	-	101	-	104	-	98	-	102
	SD	-	20	-	20	-	19	-	21	-	19	-	19
	N	-	53	-	721	-	130	-	1922	-	128	-	1923

Table A4.4.2 Year 4 Special Education Needs Students: Sub-group effect sizes and confidence intervals

Variable	Comparison	Critical Thinking in Health and PE		
		Mod./No		
SENS Level	Upper	0.92		
	Effect Size	0.57		
	Lower	0.23		

Table A4.4.3 Year 8 Special Education Needs Students: Means, standards deviations and sample sizes

Variable		Critical Thinking in Health and PE				Attitude to Health				Attitude to PE			
		High	Mod.	On Ref.	No	High	Mod.	On Ref.	No	High	Mod.	On Ref.	No
Gender	Mean	-	104	-	112	-	99	-	96	-	97	-	98
	SD	-	17	-	20	-	20	-	18	-	23	-	21
	N	-	37	-	719	-	108	-	1939	-	108	-	1937

Table T4.4.4 Year 8 Special Education Needs Students: Sub-group effect sizes and confidence intervals

Variable	Comparison	Critical Thinking in Health and PE	
		Mod./No	
SENS Level	Upper	0.82	
	Effect Size	0.41	
	Lower	-0.01	

Table A4.4.5 Year 8/Year 4 Special Education Needs Students: Differences, effect sizes and confidence intervals

Variable		Critical Thinking in Health and PE				Attitude to Health				Attitude to PE			
		High	Mod.	On Ref.	No	High	Mod.	On Ref.	No	High	Mod.	On Ref.	No
SENS Level	Upper	-	1.97	-	1.29	-	0.19	-	-0.30	-	0.28	-	-0.11
	Effect Size	-	1.38	-	1.15	-	-0.13	-	-0.38	-	-0.04	-	-0.19
	Lower	-	0.79	-	1.01	-	-0.45	-	-0.46	-	-0.36	-	-0.27

## 5. Achievement in Health by Opportunities to Learn statements

Table A4.5.1 Year 4 responses to Health Opportunities to learn statements: Means, Standard deviations, Ns

Statement		Frequency Category			
		Not at all	A little	Quite a lot	Heaps
Work in groups to think about and discuss things in health	Mean	89	91	89	83
	SD	19	19	21	21
	N	90	347	194	133
Learn something in health that is important to me	Mean	89	89	90	88
	SD	20	20	21	20
	N	29	217	269	241
Take action to improve my health after learning something in class	Mean	83	83	90	88
	SD	22	22	21	20
	N	50	50	272	250
Share things I've learned about health with others	Mean	91	88	90	86
	SD	19	20	20	22
	N	138	253	194	178
My whole class does things that help me learn about health	Mean	89	91	90	83
	SD	21	18	21	21
	N	141	278	190	156

Table A4.5.2 Year 4 responses to Health Opportunities to Learn statements: Sub-group effect sizes and confidence intervals

Statement	Opportunity to Learn						
	Comparison	Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
Work in groups to think about and discuss things in health	Upper	0.35	0.30	0.02	0.14	-0.14	-0.01
	Effect Size	0.06	-0.02	-0.31	-0.08	-0.39	-0.29
	Lower	-0.22	-0.33	-0.65	-0.30	-0.64	-0.56
Learn something in health that is important to me	Upper	0.45	0.48	0.41	0.26	0.19	0.14
	Effect Size	-0.03	0.00	-0.07	0.04	-0.04	-0.08
	Lower	-0.52	-0.47	-0.56	-0.19	-0.27	-0.29
Take action to improve my health after learning something in class	Upper	0.49	0.74	0.65	0.74	0.65	0.12
	Effect Size	0.00	0.36	0.27	0.36	0.27	-0.10
	Lower	-0.49	-0.02	-0.11	-0.02	-0.11	-0.31
Share things I've learned about health with others	Upper	0.10	0.20	0.01	0.32	0.13	0.06
	Effect Size	-0.16	-0.07	-0.27	0.09	-0.11	-0.20
	Lower	-0.42	-0.34	-0.54	-0.14	-0.35	-0.45
My whole class does things that help me learn about health	Upper	0.34	0.30	-0.01	0.18	-0.17	-0.06
	Effect Size	0.08	0.03	-0.30	-0.05	-0.41	-0.33
	Lower	-0.17	-0.25	-0.59	-0.28	-0.66	-0.59

Table A4.5.3 Year 8 responses to Health Opportunities to Learn statements: Means, Standard deviations, Ns

Statement		Response Category			
		Not at all	A little	Quite a lot	Heaps
Work in groups to think about and discuss things in health	Mean	113	111	111	110
	SD	20	19	19	25
	N	64	349	266	68
Learn something in health that is important to me	Mean	113	109	112	113
	SD	20	19	19	23
	N	40	269	345	93
Take action to improve my health after learning something in class	Mean	109	109	113	113
	SD	21	20	19	20
	N	47	292	313	95
Share things I've learned about health with others	Mean	110	113	109	111
	SD	18	19	20	26
	N	166	353	176	53
My whole class does things that help me learn about health	Mean	113	112	110	111
	SD	19	19	20	22
	N	120	390	189	48



Table A4.5.4 Year 8 responses to Health Opportunities to Learn statements: Sub-group effect sizes and confidence intervals

Statement	Opportunity to Learning						
	Comparison	Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
Work in groups to think about and discuss things in health	Upper	0.25	0.25	0.29	0.19	0.25	0.27
	Effect Size	-0.09	-0.09	-0.13	0.00	-0.07	-0.07
	Lower	-0.42	-0.43	-0.56	-0.20	-0.40	-0.40
Learn something in health that is important to me	Upper	0.25	0.39	0.47	0.35	0.46	0.31
	Effect Size	-0.17	-0.02	0.00	0.15	0.16	0.02
	Lower	-0.58	-0.42	-0.46	-0.05	-0.13	-0.26
Take action to improve my health after learning something in class	Upper	0.40	0.61	0.61	0.41	0.45	0.25
	Effect Size	0.01	0.23	0.18	0.21	0.16	-0.04
	Lower	-0.37	-0.15	-0.26	0.01	-0.13	-0.33
Share things I've learned about health with others	Upper	0.37	0.21	0.40	0.03	0.24	0.45
	Effect Size	0.14	-0.05	0.02	-0.19	-0.12	0.06
	Lower	-0.09	-0.32	-0.37	-0.42	-0.48	-0.32
My whole class does things that help me learn about health	Upper	0.16	0.09	0.32	0.11	0.36	0.49
	Effect Size	-0.09	-0.19	-0.10	-0.11	-0.01	0.09
	Lower	-0.35	-0.48	-0.52	-0.32	-0.38	-0.31

## 6. Achievement in PE by Opportunities to Learn statements

Table A4.6.1 Year 4 responses to PE Opportunities to Learn statements: Means, Standard deviations, Ns

Statement		Response Category			
		Not at all	A little	Quite a lot	Heaps
Use equipment to play and move around	Mean	83	89	88	89
	SD	27	20	20	20
	N	23	137	239	362
Have challenges like making up movement patterns or solving problems	Mean	89	89	88	89
	SD	21	19	21	20
	N	71	204	250	233
Work in teams or groups	Mean	81	90	90	88
	SD	21	19	20	21
	N	15	134	258	356
Learn about playing fair	Mean	83	85	89	90
	SD	22	23	19	20
	N	18	98	229	415
Learn how to be safe when I am moving in different ways	Mean	79	87	90	89
	SD	24	18	21	20
	N	31	119	230	382
Learn new skills and different ways of moving	Mean	86	86	90	89
	SD	25	23	19	20
	N	22	107	229	405

Table A4.6.2 Year 4 responses to PE Opportunities to Learn statements: Sub-group effect sizes and confidence intervals

Statement	Response to	Opportunity to Learn						
		Comparison	Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
Use equipment to play and move around	Upper		0.83	0.76	0.81	0.20	0.24	0.26
	Effect Size		0.28	0.23	0.29	-0.06	0.00	0.06
	Lower		-0.28	-0.31	-0.24	-0.32	-0.25	-0.14
	Comparison		Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
Have challenges like making up movement patterns or solving problems	Upper		0.37	0.30	0.34	0.17	0.21	0.26
	Effect Size		0.03	-0.03	0.01	-0.06	-0.03	0.04
	Lower		-0.30	-0.35	-0.32	-0.29	-0.26	-0.19
	Comparison		Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
Work in teams or groups	Upper		1.12	1.09	0.97	0.27	0.16	0.10
	Effect Size		0.45	0.44	0.32	0.01	-0.09	-0.10
	Lower		-0.23	-0.21	-0.32	-0.25	-0.33	-0.30
	Comparison		Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
Learn about playing fair	Upper		0.75	0.90	0.93	0.46	0.49	0.25
	Effect Size		0.12	0.30	0.34	0.16	0.21	0.05
	Lower		-0.52	-0.30	-0.24	-0.13	-0.06	-0.15
	Comparison		Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
Learn how to be safe when I am moving in different ways	Upper		0.90	0.98	0.98	0.43	0.40	0.19
	Effect Size		0.40	0.51	0.52	0.15	0.14	-0.01
	Lower		-0.10	0.04	0.06	-0.12	-0.11	-0.22
	Comparison		Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
Learn new skills and different ways of moving	Upper		0.58	0.78	0.67	0.50	0.39	0.11
	Effect Size		0.01	0.24	0.14	0.22	0.13	-0.09
	Lower		-0.57	-0.31	-0.40	-0.07	-0.14	-0.29

Table A4.6.3 Year 8 responses to PE Opportunities to Learn statements: Means, Standard deviations, Ns

Statement		Response Category			
		Not at all	A little	Quite a lot	Heaps
Use equipment to play and move around	Mean	116	106	112	113
	SD	14	19	20	19
	N	8	128	285	324
Have challenges like making up movement patterns or solving problems	Mean	113	111	111	111
	SD	18	19	21	20
	N	63	311	228	140
Work in teams or groups	Mean	106	108	111	112
	SD	26	20	20	19
	N	4	59	295	388
Learn about playing fair	Mean	119	111	112	111
	SD	19	19	19	20
	N	13	145	288	298
Learn how to be safe when I am moving in different ways	Mean	114	111	113	109
	SD	23	19	20	19
	N	22	181	318	225
Learn new skills and different ways of moving	Mean	110	111	113	110
	SD	28	18	20	20
	N	10	136	293	307

Table A4.6.4 Year 8 responses to PE Opportunities to statements: Subgroup effect sizes and confidence intervals

Statement	Comparison	Opportunity to Learn					
		Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
Use equipment to play and move around	Upper	0.36	0.66	0.74	0.55	0.64	0.29
	Effect Size	-0.54	-0.21	-0.13	0.29	0.39	0.09
	Lower	-1.44	-1.09	-1.01	0.02	0.13	-0.11
Have challenges like making up movement patterns or solving problems	Comparison	Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
	Upper	0.26	0.24	0.28	0.18	0.23	0.28
	Effect Size	-0.08	-0.11	-0.10	-0.04	-0.02	0.02
Work in teams or groups	Comparison	Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
	Upper	1.42	1.50	1.55	0.48	0.53	0.24
	Effect Size	0.13	0.27	0.33	0.14	0.19	0.05
Learn about playing fair	Comparison	Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
	Upper	0.31	0.33	0.32	0.29	0.26	0.17
	Effect Size	-0.41	-0.37	-0.38	0.04	0.01	-0.03
Learn how to be safe when I am moving in different ways	Comparison	Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
	Upper	0.40	0.52	0.32	0.36	0.17	0.01
	Effect Size	-0.16	-0.02	-0.23	0.14	-0.07	-0.21
Learn new skills and different ways of moving	Comparison	Not at all/A little	Not at all/Quite a lot	Not at all/Heaps	A little/Quite a lot	A little/Heaps	Quite a lot/Heaps
	Upper	0.85	0.93	0.79	0.36	0.21	0.06
	Effect Size	0.05	0.14	0.00	0.10	-0.04	-0.14
	Lower	-0.76	-0.64	-0.78	-0.15	-0.29	-0.34

## Appendix 5:

# The interaction Between Ethnicity and Decile: Regression Analysis

Reporting on differences between groups of students in New Zealand by ethnicity is a complex matter. Analysis is complicated on two counts. First, as mentioned in the main part of the report, a high proportion of Māori and Pasifika students attend lower decile schools, and a much lower proportion attend high decile schools. This situation inflicts a skew on the distribution of all ethnic sub-groups with respect to decile. An added problem in the health and physical education analysis is that we already start with a reduced sample (8 students in each school were selected for the health and physical education assessment), and sample sizes are then further reduced when we looked at sub-groups. The limit on sample numbers makes it impossible to estimate model parameters with a high level of precision.

The second complication is that students may identify with more than one ethnic group. It is difficult to make useful, robust statistical statements with respect to performance in ethnicity sub-groups when there is substantial 'blurring' with regard to group membership.

To explore the performance of ethnic groups on the Critical Thinking in Health and Physical Education measure across deciles the following regression analyses were carried out:

- a comparison of Māori and NZ European students' critical thinking outcomes
- a comparison of Pasifika and NZ European students' critical thinking outcomes

For the purposes of the analysis decile was coded to quintile.<sup>34</sup>

In all cases, there was a strong (statistically significant) quintile effect. Average scores increased consistently with quintile.

The results from this analysis should be interpreted with caution. The model's ability to precisely assess how Māori or Pasifika students are performing, on average, in higher decile schools (and how NZ European students are performing in lower decile schools) is compromised by the disproportionate numbers of students in those deciles in the national sample with respect to their ethnicity.

For each year level and for both Māori and Pasifika sub-groups, separate models were run to examine the effect on performance outcomes due to quintile and ethnicity.

### Final Māori model:

At each of Year 4 and Year 8, the following model was found to be the most parsimonious in the context of the variables of interest.

For student  $i$

Critical Thinking in Health and Physical Education score $_i$   $F = \alpha + \beta 1_i * \text{quintile} + \beta 2_i * \text{Māori} + \beta 3_i * \text{NZE} + \text{error}_i$

where quintile, Māori, and NZE are all classification ('dummy') variables.

Students with dual ethnicity were identified under both 'Māori' and 'NZE' classifications.

The  $R^2$  statistic, indicating the proportion of variance in the Critical Thinking in Health and Physical Education scores accounted for by the model was 0.11 at both Year 4 and 0.10 at Year 8. That is, 10-11 percent of the variance in the KAMSI scores for Māori and NZ European students could be accounted for by quintile and ethnicity.

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<sup>34</sup> Decile 1-2 → Quintile 1, Decile 3-4 → Quintile 2, ..., Decile 9-10 → Quintile 5

Models with additional interaction terms were considered, but showed no significant improvement over the main effects model specified above. Models were compared using the usual F-test where the hypotheses are:

- $H_0$ : reduced model is adequate
- $H_A$ : full model is better

Then =  $\frac{\left(\frac{\text{Drop in SSE}}{\text{Number of added terms}}\right)}{S^2 \text{ for the full model}}$ , where SSE = Sum of the squared residuals in the respective model

#### Final Pasifika model:

At each of Year 4 and Year 8, the following model was found to be the most parsimonious in the context of the variables of interest.

For student  $i$

Critical Thinking in Health and Physical Education score $_i$   $F = \alpha + \beta 1_i * \text{quintile} + \beta 2_i * \text{Pasifika} + \beta 3_i * \text{NZE} + \text{error}_i$

where quintile, Pasifika, and NZE are all classification ('dummy') variables.

Similar to the Māori model, students with both Pasifika and NZ European ethnicity were identified under both classifications in the model.

The  $R^2$  statistic, indicating the proportion of variance in the Critical Thinking in Health and Physical Education scores accounted for by the model was 0.17 at both Year 4 and Year 8.

As with the Māori models, no improvement was made at either year level when interaction terms were added to the Pasifika models.

#### Summary:

In all cases, the models showed that there was an effect due to ethnicity which remained after accounting for the quintile effect. That is, there was a difference in average critical thinking scores between each ethnic sub-group and NZ European students over and above the difference accounted for by quintile. This difference was constant (as far as the model could determine) across all quintiles.

Figures A5.1 to A5.4 show critical thinking scores by decile. Ethnic group membership is shown by using different symbols. Average scores for each group are shown using dotted lines and symbols. The variation in scores at each quintile is considerable. Despite there being differences, on average, between the Māori and Pasifika groups and the NZ European groups, there are many students in low decile schools scored higher in the health and physical education than students in high decile schools.

At Year 4, the modelled scale scores show that on average Māori students scored nine scale score units lower than NZ European students (Table A5.1 and Figure A5.1), and at Year 8, seven scale score units lower (Table A5.2 and Figure A5.2)

Table A5.1 Year 4: Modelled averages on the Critical Thinking in Health and Physical Education scale by quintile and ethnicity

Quintile	NZE	Māori
1	82	73
2	89	80
3	93	84
4	93	84
5	97	88

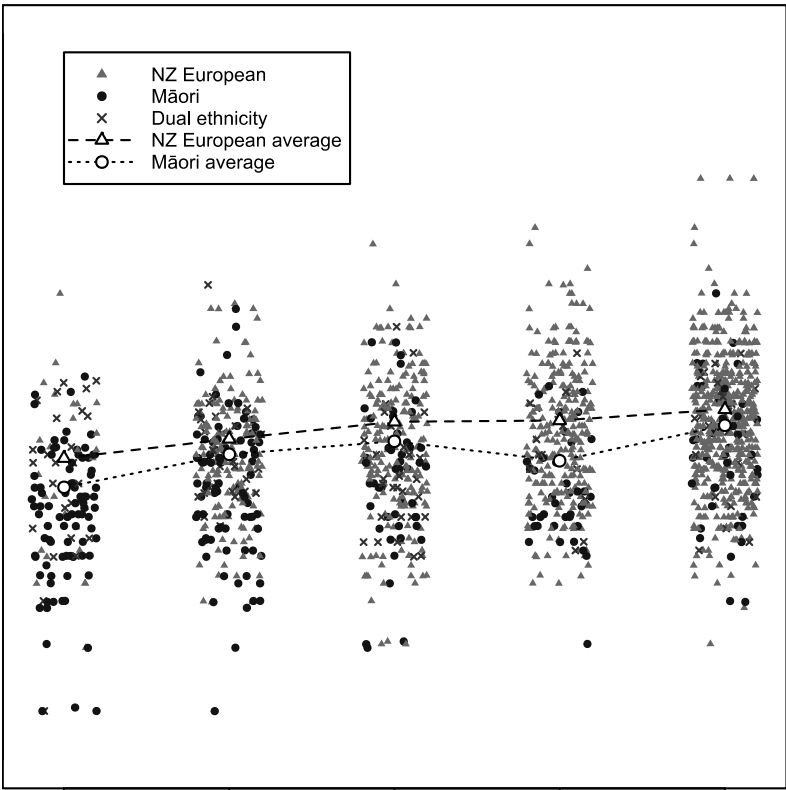


Figure A5.1 Year 4 NZ European and Māori students' Critical Thinking in Health and PE scores by quintile



Table A5.2 Year 8: Modelled averages on the Critical Thinking in Health and Physical Education scale by quintile and ethnicity

Quintile	NZE	Māori
1	110	102
2	110	103
3	114	107
4	116	109
5	122	115

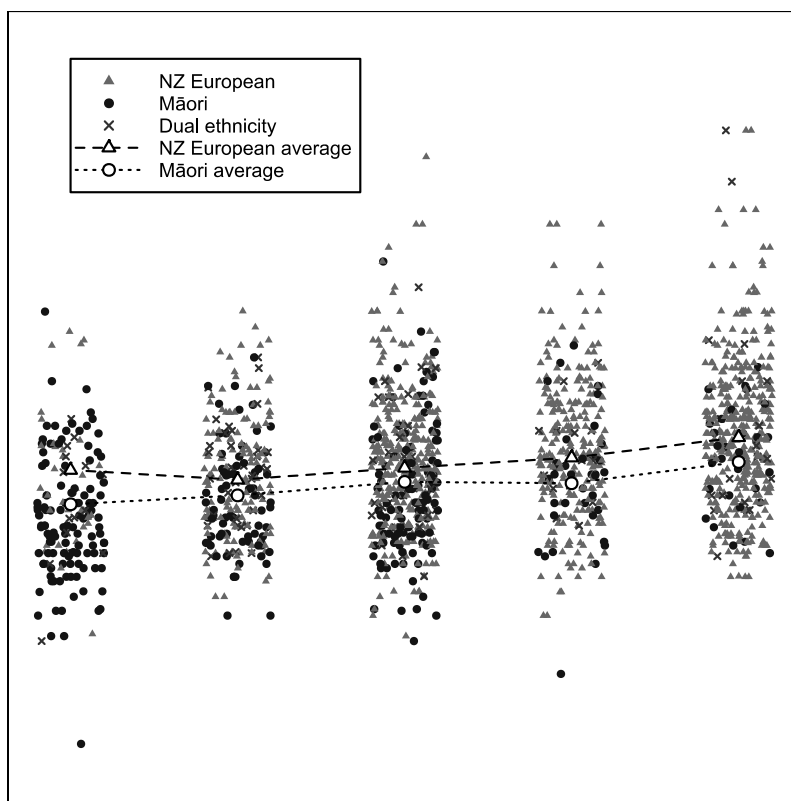


Figure A5.2 Year 8 NZ European and Māori students' Critical Thinking in Health and PE scores by quintile

At Year 4, the modelled scale scores showed that on average Pasifika students scored 15 scale score units lower than NZ European students (Table A5.3 and Figure A5.3), and at Year 8, 14 scale score units lower (Table A5.4 and Figure A5.4).

Table A5.3 Year 4: Modelled averages on the Critical Thinking in Health and Physical Education scale by quintile and ethnicity

Quintile	NZE	Pasifika
1	85	70
2	88	74
3	92	77
4	93	78
5	97	82

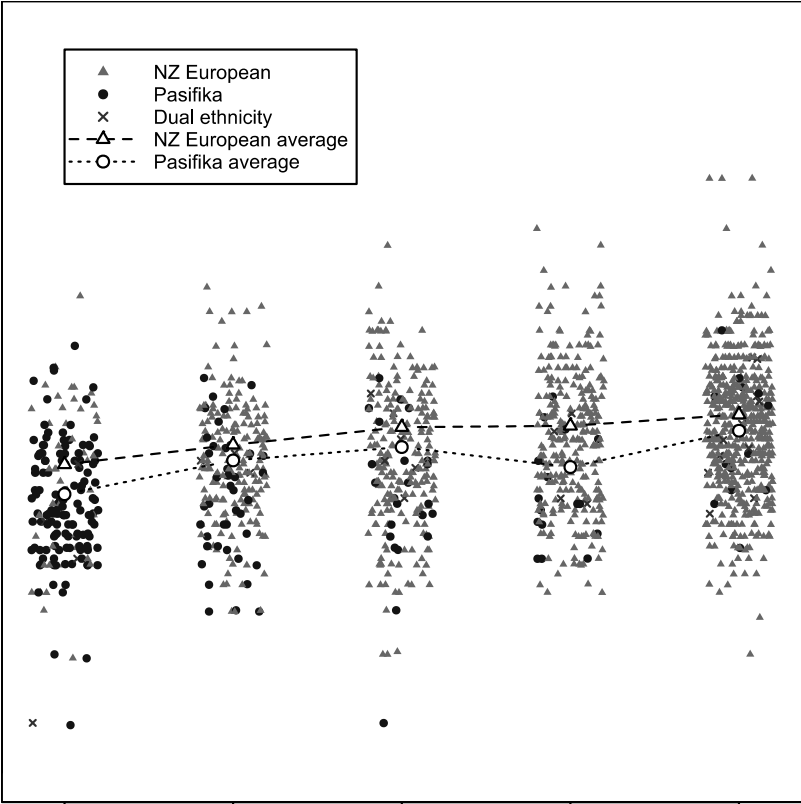


Figure A5.3 Year 4 NZ European and Pasifika students' Critical Thinking in Health and PE scores by quintile

Table A5.4 Year 8: Modelled averages on the Critical Thinking in Health and PE scale by quintile and ethnicity

Quintile	NZE	Pasifika
1	107	93
2	113	98
3	114	99
4	117	102
5	122	108

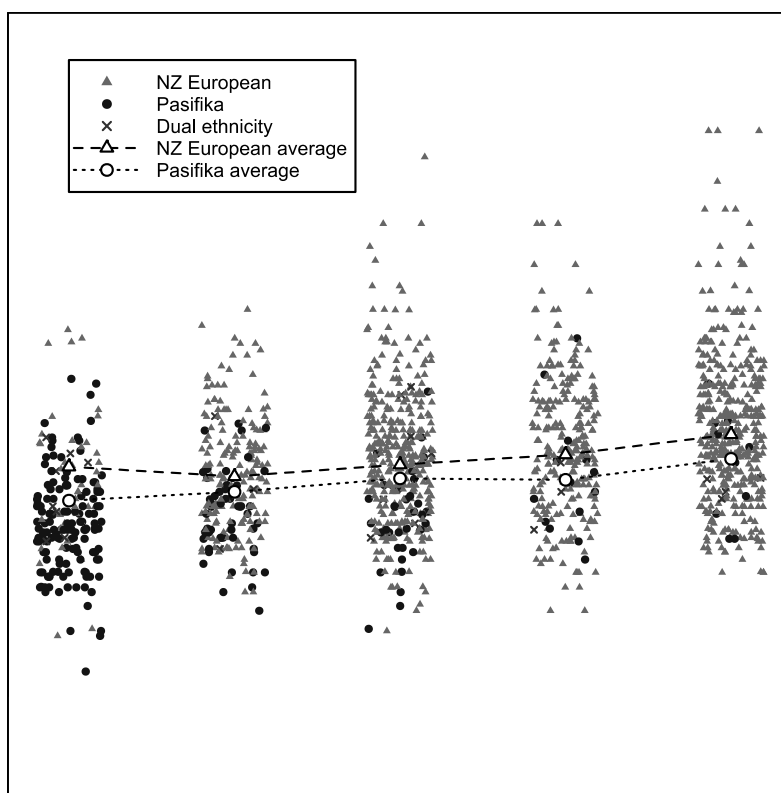


Figure A5.4 Year 8 NZ European and Pasifika students' Critical Thinking in Health and PE scores by quintile

## Appendix 6: Opportunities to Learn Health and Physical Education for Students at Year 4 and Year 8 With Moderate and No Special Education Needs

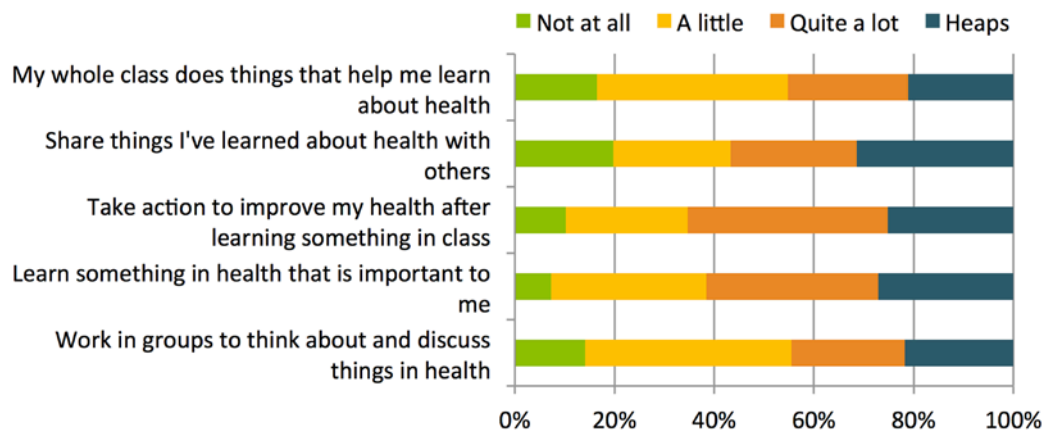


Figure A6.1 Year 4 - Opportunities to learn health for students with moderate special education needs

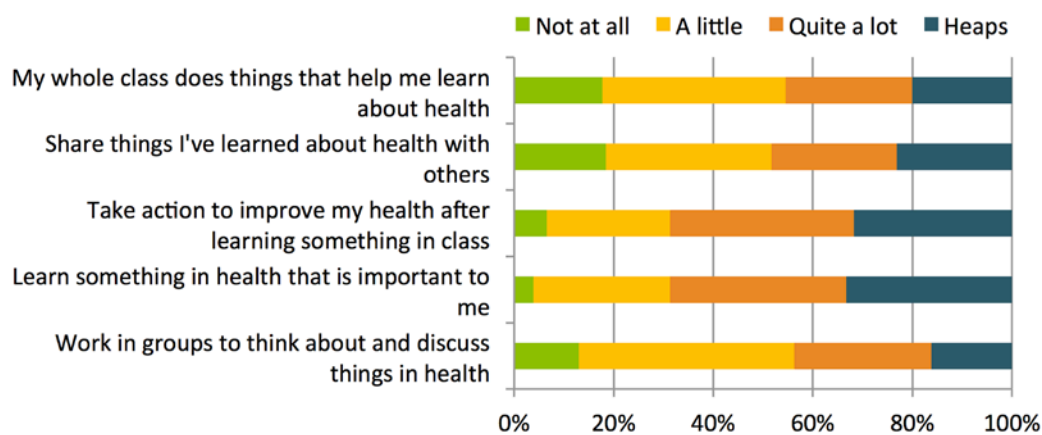


Figure A6.2 Year 4 - Opportunities to learn health for students with no special education needs

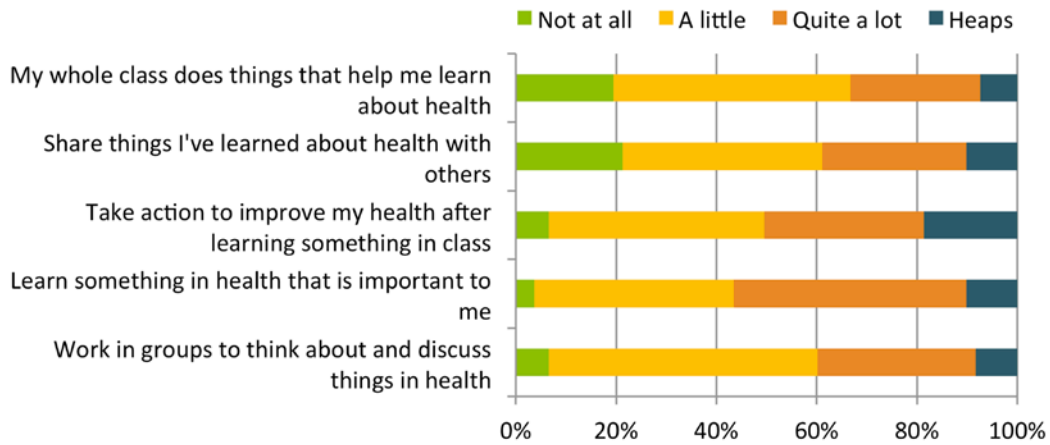


Figure A6.3 Year 8 - Opportunities to learn health for students with moderate special education needs

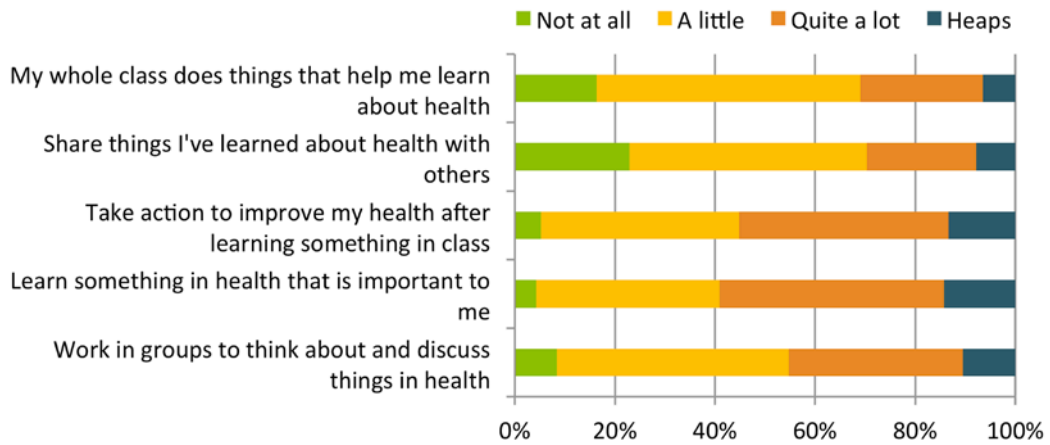


Figure A6.4 Year 8 - Opportunities to learn health for students with no special education needs

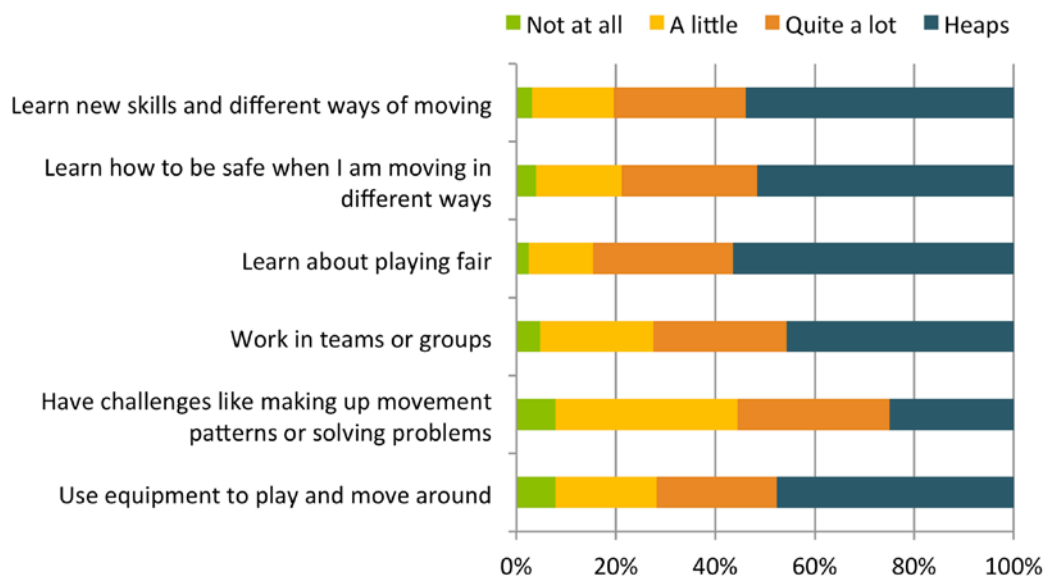


Figure A6.5 Year 4 - Opportunities to learn PE for students with moderate special education needs

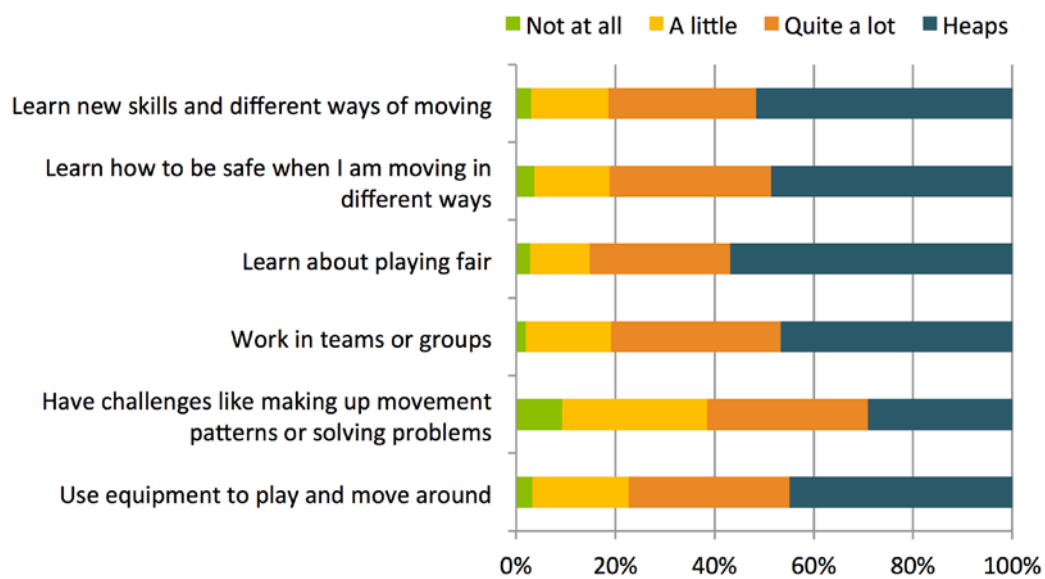


Figure A6.6 Year 4 - Opportunities to learn PE for students with no special education needs

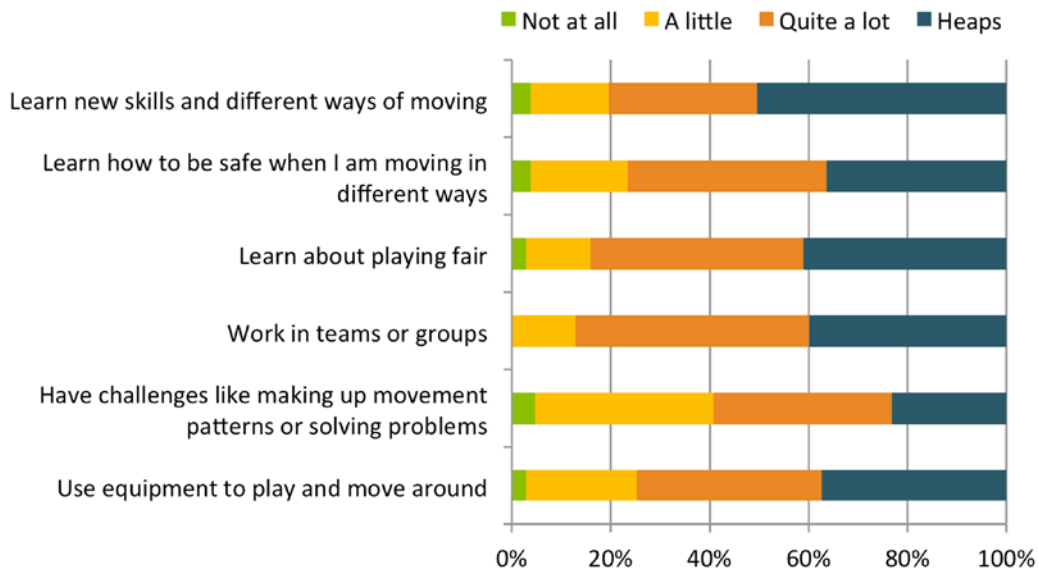


Figure A6.7 Year 8 - Opportunities to learn PE for students with moderate special education needs

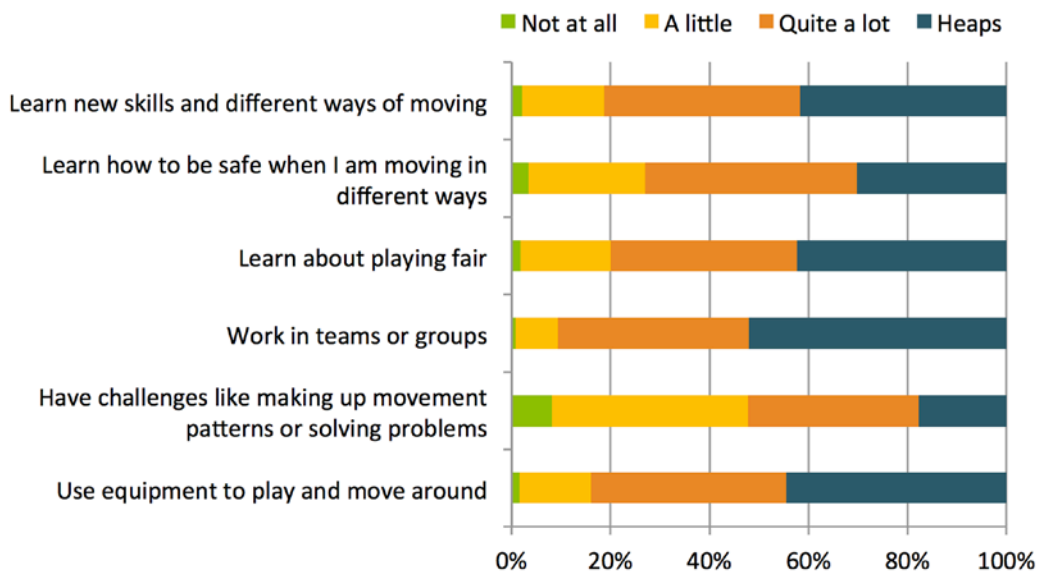


Figure A6.8 Year 8 - Opportunities to learn PE for students with no special education needs