

# Programme for International Student Assessment (PISA)

In 2000 New Zealand took part in an international study that assessed 15-year-old students in three key areas of knowledge and skill: reading literacy, mathematical literacy and scientific literacy. This study, known as the Programme for International Student Assessment (PISA), was commissioned by the Organisation for Economic Co-operation and Development (OECD). New Zealand was one of 32 countries that took part. Twenty-eight of these countries are members of the OECD.

The year 2000 was the first occasion on which PISA was administered. From now on it will be administered every three years. Although each area of knowledge and skill is assessed on each occasion, the focus of the study changes. In 2000 the focus was on reading literacy, in 2003 it will be on mathematical literacy and in 2006 it will be on scientific literacy. The main focus on reading literacy means that, as well as looking at how students have performed on average, we can also look at the different levels of proficiency they achieved in this assessment.

This report summarises the main results for New Zealand from the PISA 2000 study. This report is based on results published in the first international report on PISA entitled *Knowledge and Skills for Life — First results from PISA 2000*. The international report was prepared by the OECD.

A more detailed national report is planned for early 2002. It will expand on the information described in this summary report. The extended national report will also include results that focus on information collected only within New Zealand, such as student ethnicity and school decile<sup>1</sup>. These New Zealand-specific results are not covered in this summary report, nor are they covered in the international report on PISA 2000.

## KEY POINTS

**In terms of its mean or average score, New Zealand is among the six best performing countries for each of reading, mathematical and scientific literacy.**

- Out of 32 countries we have the third highest mean scores for both reading literacy and mathematical literacy and the sixth highest mean score for scientific literacy.

**In terms of reading literacy, New Zealand has the highest proportion of its students at the top level of proficiency.**

- We have 19 percent of our students in the highest proficiency level (Level 5) for reading literacy. This is about 1 in 5 of our students compared with an international average of about 1 in 10 students.

**In terms of the spread of scores, New Zealand has a very wide distribution for each of reading, mathematical and scientific literacy.**

- This is also the case in some other countries with high average performance like Australia and the United Kingdom.
- The spread of scores is generally wide within individual schools in New Zealand. This means that each school is likely to be working with a diverse range of student ability.

## AN OVERVIEW OF PISA

PISA is a collaborative effort among the member countries of the OECD to measure how well young adults, at age 15, are prepared to meet the challenges of today's knowledge societies. This study is only one of the ways in which we can find out how well our young adults are being prepared for life beyond school. Results from this study should be considered alongside all of the other information we know about our young adults in determining the needs of our students, of our education system and of our society as a whole.

The first PISA assessment took place in 2000 and involved more than a quarter of a million students aged from 15 years 3 months to 16 years and 2 months. As most of these students are 15-year-olds, this report refers to them as "15-year-olds" for brevity.

In New Zealand 3667 students from 153 secondary schools participated in this study. These students were drawn at random from all of the students in each school who were between the ages of 15 years 3 months and 16 years 2 months.

PISA 2000 covered three areas of skills and knowledge known in this study as *domains*. These domains are: reading literacy, mathematical literacy and scientific literacy. The assessments did not just focus on student knowledge. They also examined the ability of 15-year-olds to reflect on that knowledge and on their own experience, and to apply that knowledge and experience to real world issues. As such PISA is not limited to mastery of specific school curricula. That is, the PISA tasks are not specifically drawn from language, mathematics or science curricula among the OECD countries that are taking part. To capture this broader definition the term 'literacy' has been used with all three domains.

Each student was assessed for about two hours on pencil-and-paper items. Students were given different combinations of tasks so that overall for each country a larger pool of tasks was assessed. The tasks used in PISA comprised both multiple-choice and short-answer questions. The latter required students to construct their own responses. Tasks were typically organised around a passage describing a real-life situation.

In addition to the assessment, students answered a background questionnaire. This provided the information used to relate the results in each domain to some of the contextual factors affecting student performance. School principals also completed a questionnaire about their school.

In PISA 2000 reading literacy is the major focus. In PISA 2003 mathematical literacy will be the key domain and in PISA 2006 it will be scientific literacy. When a domain is the focus of PISA more tasks are assessed overall in that domain than in the other two domains. As a consequence in PISA 2000 we can report in more detail about student performance in reading literacy than in the other two domains.

In PISA 2000 we can look at the mean score achieved by students, and sub-groups of students, within and across countries in reading, mathematical and scientific literacy. We can also look at the spread or distribution of their scores in these three domains.

In PISA 2000 we can also look at the different levels of proficiency that students achieve in reading literacy. By assessing the different levels that students achieve in reading literacy it is possible to have a better understanding of not only how students perform relative to one another, but also to describe what they can do. For example, students who are less proficient (i.e. are in the lower proficiency levels) tend to be able to process or understand relatively simple and familiar information. Students who are more proficient (i.e. are in the higher levels of proficiency) tend to be able to process or understand more complex and less familiar information.

# A Profile of Student Proficiency in Reading Literacy

## WHAT READING LITERACY IS

Reading literacy is defined in PISA as:

*“ the ability to understand, use and reflect on written texts in order to achieve one’s goals, to develop one’s knowledge and potential, and to participate effectively in society.”*

The focus here is not on assessing the most basic reading skills — it is on “reading to learn”. Students are expected to demonstrate their skills in retrieving information, understanding texts at a general level, interpreting them, reflecting on the content and form of texts in relation to their own knowledge and evaluating and arguing their own point of view.

The assessment tasks in reading encompass a wide range of continuous and non-continuous texts. They include both continuous prose passages, which may be narrative, descriptive, expository (explaining how something is done) or present an argument, and non-continuous texts such as tables, lists, forms, graphs and diagrams.

Assessment tasks are drawn from a variety of situations both within and beyond the school doors. So in addition to texts that students could possibly be assigned as part of schoolwork, the texts include those that students could be expected to encounter in other aspects of life. This includes texts that could be considered to be for personal use (e.g. letters or novels they may read), or those they may encounter as a member of society (e.g. newspaper articles, official documents, or public notices). It also includes those they may expect to encounter when they enter the workforce (e.g. job application forms, office memoranda, order forms). Although many students may not have encountered texts in this last category, most societies would expect their young adults to have gained the skills and knowledge to be able to deal with these types of reading literacy tasks.

Descriptions of some reading literacy tasks appear later in this section.

## HOW READING LITERACY IS MEASURED IN PISA

About two-thirds of the assessment was devoted to measuring how proficient students were in reading literacy. In order to determine proficiency, students were assigned scores according to their ability to answer task-related questions on three scales.

The reading literacy scales used in PISA are:

- a “retrieving information” scale that reports students’ ability to locate information in text;
- an “interpreting texts” scale that reports students’ ability to construct meaning and draw inferences from written information; and
- a “reflection and evaluation” scale that reports their ability to relate what they have read to their knowledge, experience and ideas.

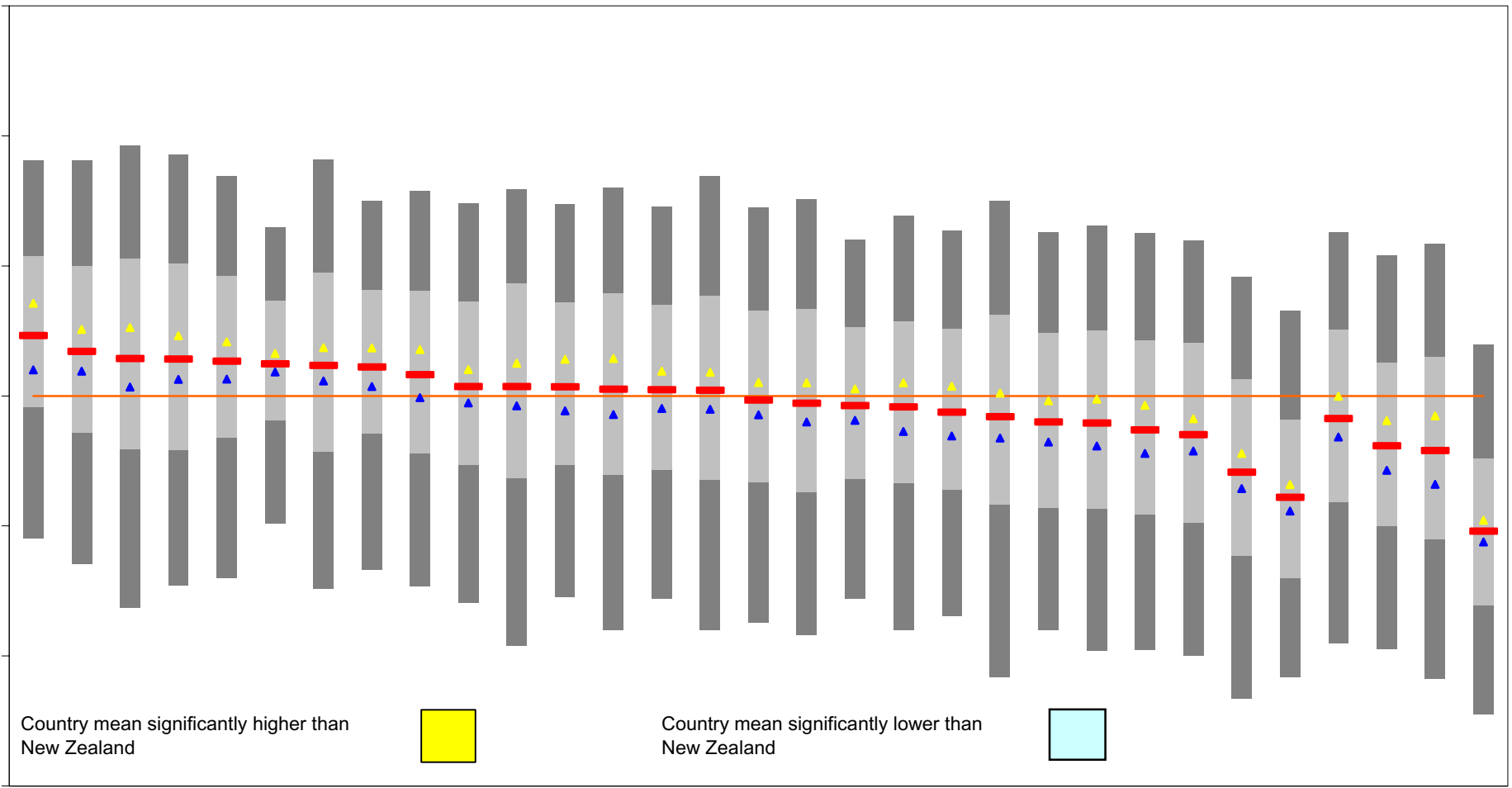
There is no hierarchical relationship assumed among these three scales. That is, they are considered to be of equal difficulty with each scale having both easy and hard tasks.

**Figure 1: Distribution of student performance on the combined reading literacy scale**

- ▲ Mean score of males
- ▲ Mean score of females
- Mean score on the combined reading literacy scale
- Bar extends from the 5th to the 95th percentiles
- Middle 50% of students from the 25th to the 75th percentiles
- OECD average

Scale score

800  
700  
600  
500  
400  
300  
200



Country mean significantly higher than New Zealand

Country mean significantly lower than New Zealand

Finland  
Canada  
New Zealand  
Australia  
Ireland  
Korea  
United Kingdom  
Japan  
Sweden  
Austria  
Belgium  
Iceland  
Norway  
France  
United States  
Denmark  
Switzerland  
Spain  
Czech Republic  
Italy  
Germany  
Hungary  
Poland  
Greece  
Portugal  
Luxembourg  
Mexico  
Liechtenstein  
Russian Federation  
Latvia  
Brazil

Source : OECD PISA database, 2001.

## **THE COMBINED READING LITERACY SCALE**

The results from the three reading scales are summarised in a combined reading literacy scale.

To allow comparison across all participating countries, students' scores on the combined reading literacy measure have been placed on a common scale. The mean score on this scale is set at 500. The mean scores for the three original scales (retrieving information, interpreting texts, and reflection and evaluation) differ slightly from 500. The combined reading literacy scale is also set so that two-thirds of the students across all OECD countries will score between 400 and 600 points on this scale, although the range for individual countries will vary from this.

## **THE MEAN PERFORMANCE OF NATIONS IN READING LITERACY**

One way of summarising student performance in reading literacy is by looking at the mean scores for each country. These are displayed in Figure 1. The shading of the countries in the lower portion of this figure indicates whether that country's mean score is significantly lower, not statistically different from or significantly higher than New Zealand.

New Zealand's performance ranks third, after Finland and Canada, on the combined reading literacy scale. New Zealand's mean score of 529 is significantly above the OECD average, but it is not significantly different from the mean score achieved in Canada. Nor is it significantly different from the mean scores of Australia, Ireland, Korea, the United Kingdom or Japan, countries that fall immediately below us.

New Zealand students also perform in the top group for each of the three reading scales (retrieving information, interpreting texts, and reflection and evaluation). For each scale they achieve above the OECD mean. New Zealand mean scores tend to cluster with Finland, Australia, Canada, Korea, Japan, Ireland, the United Kingdom, Sweden and the United States, although this does vary somewhat depending on the particular scale.

Figure 1 also shows gender differences in the performance of girls and boys. These differences between genders have been discussed in the international report as all countries emphasise the importance of reducing disparities between girls and boys. This is in recognition of the impact that education has on labour market and other life choices beyond school. However, it is acknowledged that other factors such as ethnic and socio-economic background interact with gender. In New Zealand the impact of these other factors will be explored in the extended national report.

The pattern of gender differences for reading literacy, shown in Figure 1, is fairly consistent across countries. The higher average score for girls in reading is not only universal across countries but the difference between their average scores is also large in magnitude. Among all OECD countries, girls, on average, achieve higher scores than boys by 32 points.

Female New Zealanders score, on average, 46 points higher in PISA reading literacy than their male counterparts, but the boys on average, do perform well. New Zealand boys score just above the OECD mean and rank seventh equal for boys' mean score among the OECD countries.

Looking at the individual reading literacy scales, the difference in performance in favour of girls is largest on the reflection and evaluation scale. Among OECD countries, New Zealand records the third highest gender difference on this type of reading task, behind Finland and Norway. For retrieving information and interpreting texts New Zealand is second only to Finland in the size of the gender difference.

**Figure 2: What the proficiency levels measure**

	Retrieving information	Interpreting texts	Reflection and evaluation
What is being assessed on each of the reading literacy scales:			
	Retrieving information is defined as locating one or more pieces of information in a text.	Interpreting texts is defined as constructing meaning and drawing inferences from one or more parts of a text.	Reflecting and evaluation is defined as relating a text to one's experience, knowledge and ideas.
Characteristics of the tasks associated with increasing difficulty on each of the reading literacy scales:			
	Task difficulty depends on the number of pieces of information that need to be located. Difficulty also depends on the number of conditions that must be met to locate the requested information, and on whether what is retrieved needs to be sequenced in a particular way. Difficulty also depends on the prominence of information, and the familiarity of the context. Other relevant characteristics are the complexity of the text, and the presence and strength of competing information.	Task difficulty depends on the type of interpretation required, with the easiest tasks requiring identifying the main idea in a text, more difficult tasks requiring understanding relationships that are part of the text, and the most difficult requiring either an understanding of the meaning of language in context, or analogical reasoning. Difficulty also depends on how explicitly the text provides the ideas or information the reader needs in order to complete the task; on how prominent the required information is; and on how much competing information is present. Finally, the length and complexity of the text and the familiarity of its content affect difficulty.	Task difficulty depends on the type of reflection required, with the easiest tasks requiring simple connections or explanations relating the text to external experience, and the more difficult requiring an hypothesis or evaluation. Difficulty also depends on the familiarity of the knowledge that must be drawn on from outside the text; on the complexity of the text; on the level of textual understanding demanded; and on how explicitly the reader is directed to relevant factors in both the task and the text.
<b>Level</b>			
<b>5</b>	Locate and possibly sequence or combine multiple pieces of deeply embedded information, some of which may be outside the main body of the text. Infer which information in the text is relevant to the task. Deal with highly plausible and/or extensive competing information.	Either construe the meaning of nuanced language or demonstrate a full and detailed understanding of a text.	Critically evaluate or hypothesise, drawing on specialised knowledge. Deal with concepts that are contrary to expectations and draw on a deep understanding of long or complex texts.
<b>4</b>	Locate and possibly sequence or combine multiple pieces of embedded information, each of which may need to meet multiple criteria, in a text with unfamiliar context or form. Infer which information in the text is relevant to the task.	Use a high level of text-based inference to understand and apply categories in an unfamiliar context, and to construe the meaning of a section of text by taking into account the text as a whole. Deal with ambiguities, ideas that are contrary to expectation and ideas that are negatively worded.	Use formal or public knowledge to hypothesise about or critically evaluate a text. Show accurate understanding of long or complex texts.
<b>3</b>	Locate, and in some cases recognise, the relationship between pieces of information, each of which may need to meet multiple criteria. Deal with prominent competing information.	Integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase. Compare, contrast or categorise taking many criteria into account. Deal with competing information.	Make connections or comparisons, give explanations, or evaluate a feature of text. Demonstrate a detailed understanding of the text in relation to familiar, everyday knowledge, or draw on less common knowledge.
<b>2</b>	Locate one or more pieces of information, each of which may be required to meet multiple criteria. Deal with competing information.	Identify the main idea in a text, understand relationships, form or apply simple categories, or construe meaning within a limited part of the text when the information is not prominent and low-level inferences are required.	Make a comparison or connections between the text and outside knowledge, or explain a feature of the text by drawing on personal experience and attitudes.
<b>1</b>	Take account of a single criterion to locate one or more independent pieces of explicitly stated information.	Recognise the main theme or author's purpose in a text about a familiar topic, when the required information in the text is prominent.	Make a simple connection between information in the text and common, everyday knowledge.

Source: OECD PISA, 2001.

## THE DISTRIBUTION OF READING LITERACY SCORES WITHIN COUNTRIES

The distribution of reading literacy scores within a country can also be found in Figure 1. The distribution of scores within countries focuses on the relative dispersion of scores — that is, the range of scores between the highest and lowest performing students within each country.

The spread of scores achieved by students within countries is greater than the spread of scores (as measured by the mean score) among countries.

In all countries the difference between the 75<sup>th</sup> and 25<sup>th</sup> percentiles, which covers the middle half of the national performance distribution, exceeds 90 score points on the combined reading literacy scale. In some countries this difference exceeds 140 score points. This includes countries with high overall scores like New Zealand, Australia and the United Kingdom as well as countries with lower overall scores such as Belgium and Germany.

## PERCENTAGE OF STUDENTS PROFICIENT AT EACH LEVEL OF READING LITERACY

Each of the three reading literacy scales (retrieving information, interpreting texts, and reflection and evaluation) is divided into five levels of knowledge and skills. These range from the simplest tasks in level 1 to the most complex tasks in level 5. A description of these levels is given in Figure 2.

Descriptions of some reading literacy tasks at different levels include:

### A difficult reading literacy task

*Students were shown a tree diagram of a country's working-age population, and descriptions of the labour force status of individual workers. They had to decide in which category of the diagram each worker belonged. They had to work out what criteria to use to classify workers from the structure and content of the diagram, drawing on information in footnotes and therefore not prominent. This task is at level 5 on the interpreting texts scale.*

### A medium reading literacy task

*Students had to look at two letters posted on the Internet giving conflicting opinions about graffiti. They had to comment on which was written better, analysing writing style and structure of argument rather than just what the letters said. To do this, they had to draw on their understanding of what constitutes good writing. This task is at level 4 on the reflection and evaluation text scale.*

### An easy reading literacy task

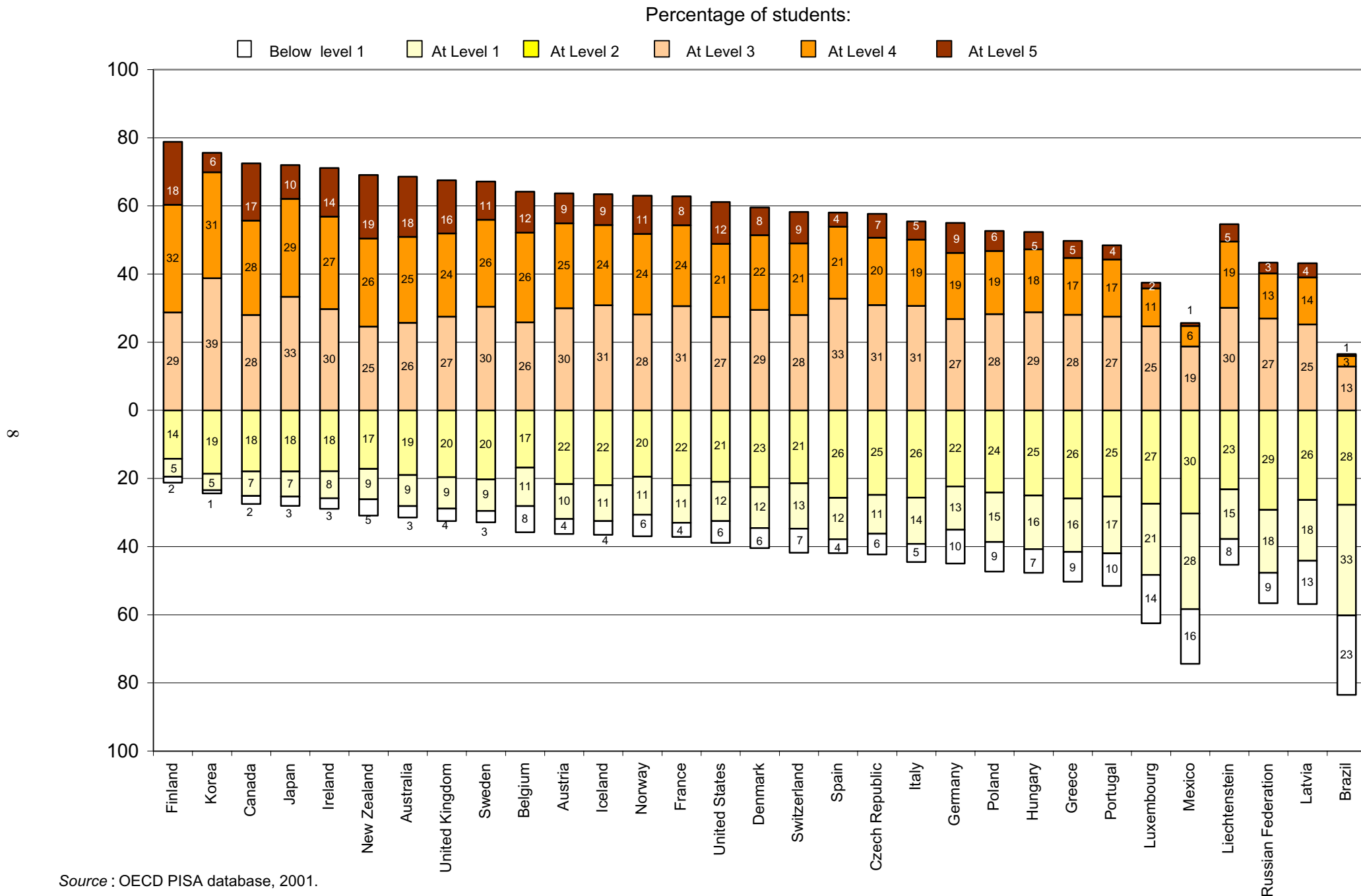
*After reading a short adventure story, students were asked in a multiple-choice task what happened next after a brief quoted extract. The answer was stated explicitly in the narrative and was easy to locate from the information given in the task. This task is at level 1 on the retrieving information scale.*

For the three reading literacy scales and the combined reading literacy scale, students are considered to be at a particular level of proficiency if they have answered at least half of the items in that level correctly. Typically this means that they not only have demonstrated the knowledge and skills associated with tasks at a particular level of proficiency but also the knowledge and skills associated with lower levels. For example, all students proficient with Level 3 tasks are typically also proficient at Levels 1 and 2. The proportion of students at each level of proficiency within each country on the combined reading literacy score is displayed in Figure 3.

The highest level of proficiency on the combined reading literacy scale is Level 5. On average, one in ten (10%) of all students in PISA 2000 are proficient at Level 5.

In New Zealand the proportion of students in Level 5 is significantly higher than the international average. Close to one in five (19%) of New Zealand students reach this level. This is the highest proportion of the OECD countries participating in PISA.

Figure 3: Percentage of students performing at each of the proficiency levels on the combined reading literacy scale



Source : OECD PISA database, 2001.

In New Zealand achievement across the three reading literacy scales of retrieving information, interpreting texts, and reflection and evaluation, is quite even:

- 22 percent reach level 5 on the retrieving information scale,
- 20 percent reach level 5 on the interpreting texts scale and
- 19 percent reach level 5 on the reflection and evaluation scale.

Across OECD countries, on average, about one third (32%) of students are proficient at Level 4 or higher on the combined reading literacy scale. In New Zealand 45 percent of students attain Level 4 or higher. New Zealand is also among the nine countries that have more than two-thirds of students at Level 3 or higher. In New Zealand 69 percent of our students achieve Level 3 or higher.

Across OECD countries, about 18 percent of students perform at Level 1 and below and in New Zealand 14 percent perform at that level. Internationally, about 12 percent of students are at Level 1 and six percent are below Level 1. In New Zealand the proportions are lower at nine percent and five percent respectively.

The spread of results among our New Zealand students is broad. This is similar for some OECD countries, but different for others. In terms of contrasting with New Zealand, Canada and Finland have a relatively large proportion of students in the higher levels of proficiency but they have a relatively low proportion of students at the most basic levels. In these countries the proportion of students who achieve at the most basic level is ten percent (Canada) and seven percent (Finland).

In terms of being similar to New Zealand, the United Kingdom, Ireland and Australia are countries that have a relatively high proportion of their students at the highest level but also a relatively high percentage at or below Level 1. In these countries the proportion that achieve at the most basic level ranges from 11 to 13 percent.

In every OECD country boys represent a significantly larger proportion of the students than do girls at the lowest levels of proficiency in reading literacy (Level 1 and below). In New Zealand eight percent of the girls perform at Level 1 or below compared with 18 percent of boys.

## **HOW STUDENT PERFORMANCE IN READING LITERACY VARIES AMONG SCHOOLS**

Looking more closely at the scores on the combined reading literacy scales we can start to try to account for the variation in student performance. One of the factors we can look at within countries is the extent to which these differences are attributable to variations in performance between schools — that is, where students from different schools tend to perform higher or lower overall.

Differences among schools can be due to many factors and these can change from country to country. Some of these factors are relatively easy to identify. Among the countries participating in PISA these include:

- different systems within the same country (countries such as Belgium have systems operated by different communities or states);
- publicly or privately managed schools (in some countries large numbers of private schools with selective enrolment policies create large differences between schools);
- programme type (countries such as Germany and Austria differentiate between students in vocational schools and general schools); and
- level of education (in some countries the PISA population covers students in both lower secondary schools and upper secondary schools).

In New Zealand only a relatively small proportion of the differences in scores (16%) is accounted for by variation in performance between schools. This compares with the average across OECD countries of 35 percent.

Australia and Norway are similar to New Zealand in that all three are among the countries with the highest overall variation in reading performance among their students, but in all three countries only a comparatively small proportion of this variation results from differences among schools. For New Zealand the impact of school decile<sup>1</sup> on this variation will be considered further in the extended national report.

In New Zealand, Australia and Norway most of the variation is explained by differences in performance within the school. In most schools in these countries you can expect to find students achieving at all levels of reading proficiency. This means that schools will generally be working with a diverse range of student ability.

# Student Performance in Mathematical and Scientific Literacy

## WHAT MATHEMATICAL LITERACY IS

Mathematical literacy is defined in PISA as:

*“the capacity to identify, understand and engage in mathematics, and to make well-founded judgements about the role that mathematics plays in an individual’s current and future private life, occupational life, social life with peers and relatives, and life as a constructive, concerned and reflective citizen.”*

In short, mathematical literacy is the ability to formulate and solve mathematical problems in real life situations.

In PISA 2000 mathematical literacy was a minor domain (in relation to reading literacy). The tasks required students to have a balanced knowledge and understanding of mathematics. Emphasis in these tasks was placed on mathematical concepts related to change and relationships and to space and shape.

## HOW MATHEMATICAL LITERACY IS MEASURED IN PISA

Mathematical literacy is scored on a single scale. In the minor domains, that is mathematical literacy and scientific literacy in PISA 2000, proficiency levels are not calculated.

Examples of tasks used to measure mathematical literacy include:

### A difficult mathematical literacy task

*Students were presented with a diagram showing the pattern in which different trees would have to be planted in an orchard in order that conifers provide sufficient protection to apple trees. They had to work out which type of tree would increase faster in number as the orchard was enlarged — and explain why. This required them to notice that the number of apple trees increased in proportion to the square of the number of conifers. The task required students to think mathematically and recognise a general principle.*

### A medium mathematical literacy task

*From a mathematical representation of the dimensions and shape of a pyramidal barn roof, students had to calculate the area of its base. This required students to identify and perform a straightforward calculation, understanding the overall concepts of space and shape.*

### An easy mathematical literacy task

*From a graph showing the speed of a racing car as it travelled round a track, students had to answer a multiple-choice task about where on the track the car went the slowest. This required only a simple observation and sufficient understanding of the concept of change to realise that the slowest speed would be shown at the lowest point of the plot on the speed graph.*

## THE MEAN PERFORMANCE OF NATIONS IN MATHEMATICAL LITERACY

From Figure 4 we can see that New Zealand students rank third behind Japan and Korea in mean achievement in mathematical literacy, although the mean scores achieved by these three countries do not differ significantly from each other. Other countries that score significantly above the OECD average but not significantly different from New Zealand include Finland, Australia, Canada, Switzerland, and the United Kingdom.

Most of the countries that perform relatively well in mathematical literacy also show better than average performance on the combined reading literacy scale.

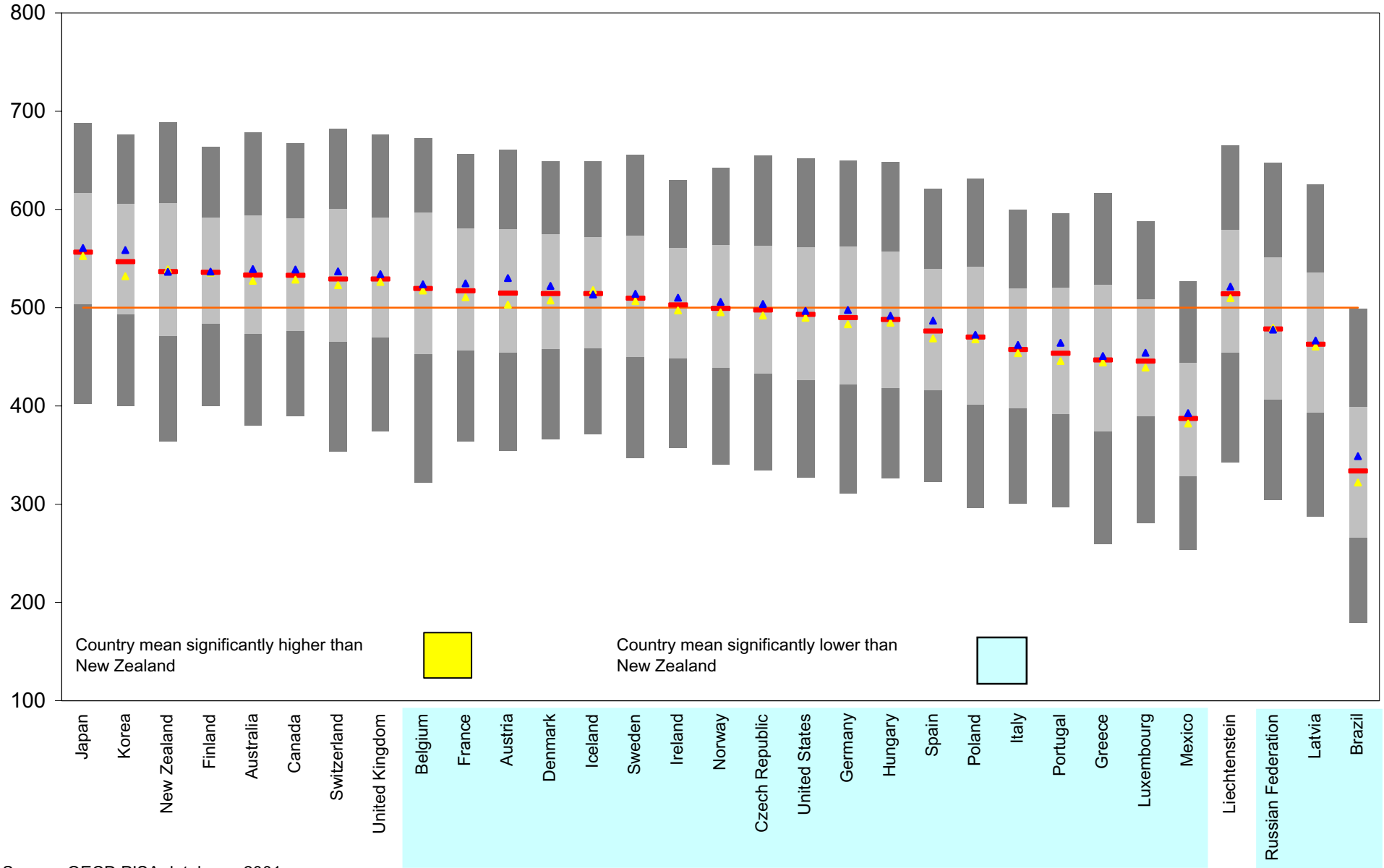
In mathematical literacy, there are significant gender differences in about half the countries. In all these cases boys do better. The average gap in mathematical literacy is around 11 points in favour of boys. New Zealand is among five countries that achieve a high average score and small gender differences.

**Figure 4: Distribution of students performance on the mathematical literacy scale**

- ▲ Mean score of males
- ▲ Mean score of females
- Mean score on the combined reading literacy score
- Bar extends from the 5th to the 95th percentiles
- Middle 50% of students from the 25th to the 75th percentiles
- OECD average

Scale score

12



Source : OECD PISA database, 2001.

## THE DISTRIBUTION OF MATHEMATICAL LITERACY SCORES WITHIN COUNTRIES

The pattern in the distribution of student performance on the mathematical literacy scale is similar to that in reading literacy. The spread of scores achieved by students within countries is greater than the spread of scores (as measured by the mean score) among countries.

In some countries the spread of scores is much greater than in other countries. New Zealand is one of many countries that show a relatively large gap between the 75<sup>th</sup> and 25<sup>th</sup> percentiles. This indicates a significant gap between our most and least mathematically literate students. See Figure 4.

## WHAT SCIENTIFIC LITERACY IS

Scientific literacy in PISA is defined as:

*“the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and help make decisions about the natural world and the changes made to it through human activity.”*

Students are asked to demonstrate their ability to think scientifically by way of understanding key scientific concepts and by interpreting and acting on evidence, primarily in everyday situations, where science can be applied.

The PISA assessment examines five scientific processes: the recognition of scientific questions; the identification of evidence; the drawing of conclusions; the communication of these conclusions; and the demonstration of understanding of scientific concepts.

## HOW SCIENTIFIC LITERACY IS MEASURED IN PISA

Scientific literacy is scored on a single scale. In the minor domains, that is mathematical literacy and scientific literacy in PISA 2000, proficiency levels are not calculated.

Examples of tasks used to measure scientific literacy include:

### A difficult scientific literacy task

*Students were shown extracts from a 19th century scientist’s diary, a table with his observations and a commentary, discussing the post-natal death from a particular fever of a large proportion of mothers in two wards of a hospital maternity clinic. Students had to indicate why the evidence did not support a contemporary belief that earthquakes caused the fever. This required them to explain the significance of different death rates in the two wards.*

### A medium scientific literacy task

*After reading a text on the risks to the ozone layer and their implications, students were asked whether each of two questions could be answered by scientific research. To answer correctly, they needed, in particular, to recognise the difference between a question that requires a political choice and one that can be answered scientifically.*

### An easy scientific literacy task

*Students were asked why washing hospital sheets in high temperatures helps reduce the risk that patients will contract a fever. In their answer they needed to apply their scientific knowledge to this real-world problem by referring, for example, to the killing of bacteria.*

## THE MEAN PERFORMANCE OF NATIONS IN SCIENTIFIC LITERACY

New Zealand is one of ten countries with a mean scientific literacy score above the OECD average. The average score for New Zealand is significantly below Korea and Japan. Although New Zealand ranks behind Finland, the United Kingdom and Canada and ahead of Australia and Austria, the mean score for New Zealand is not significantly different from any of these countries. This can be seen in Figure 5.

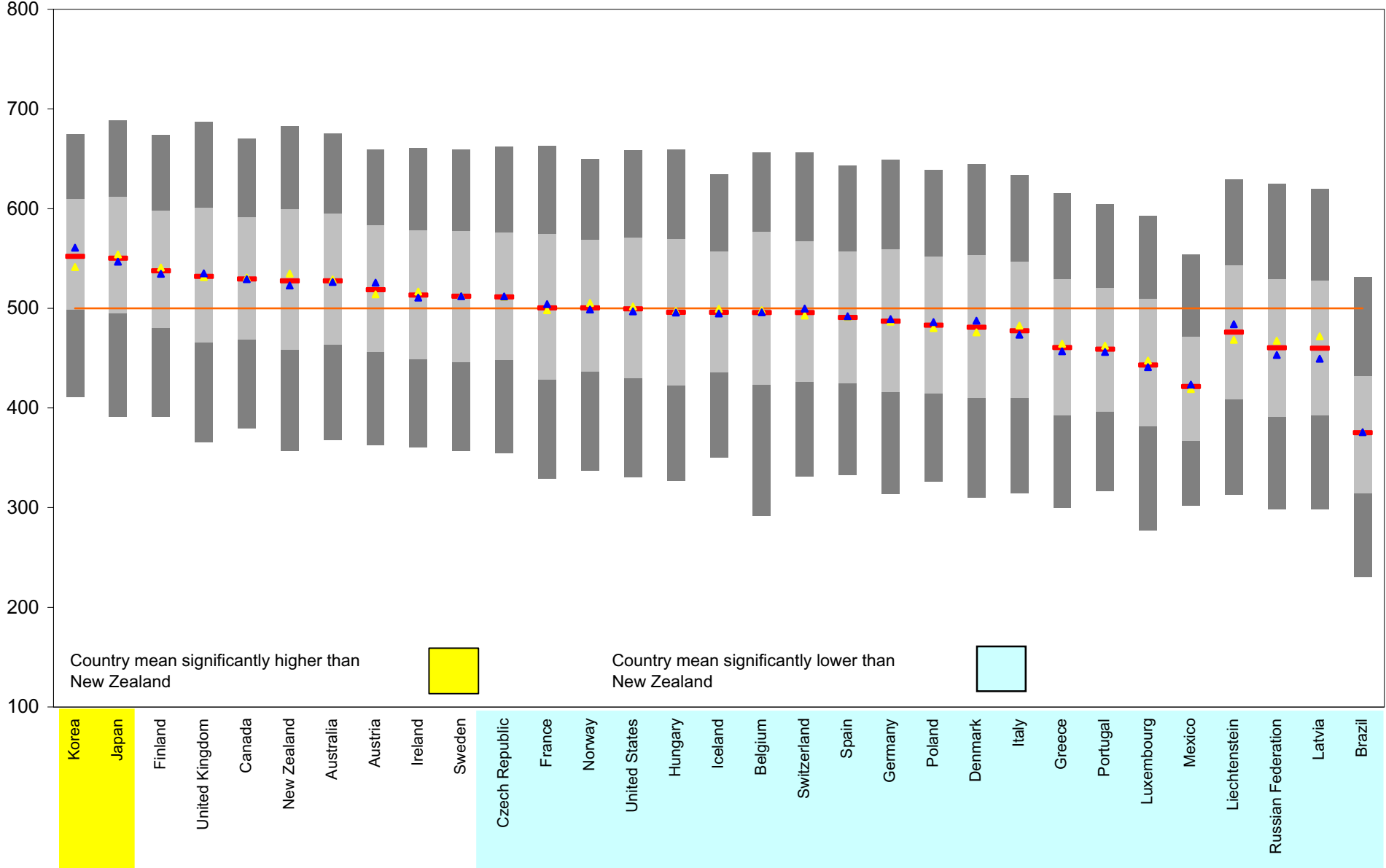
In scientific literacy the results show the least difference between genders. Twenty-six of 32 countries show no statistically significant gender differences in performance. In New Zealand both female and male students achieve relatively high scores, with girls scoring, on average, 12 points above boys.

**Figure 5: Distribution of students performance on the scientific literacy scale**

- ▲ Mean score of males
- ▲ Mean score of females
- Mean score on the scientific literacy scale
- Bar extends from the 5th to the 95th percentiles
- Middle 50% of students from the 25th to the 75th percentiles
- OECD average

Scale score

14



Source : OECD PISA database, 2001.

## **THE DISTRIBUTION OF SCIENTIFIC LITERACY SCORES WITHIN COUNTRIES**

The distribution of scores for scientific literacy within countries, as shown in Figure 5, is similar to those for reading and mathematical literacy. The spread of scores achieved by students within countries is greater than the spread of scores (as measured by the mean score) among countries.

In some countries the spread of scores is much greater than in other countries. New Zealand is one of these countries. There is a relatively large gap between the 75<sup>th</sup> and 25<sup>th</sup> percentiles, which indicates a significant gap between our most and least scientifically literate students.

## **STUDENT PERFORMANCE IN READING, MATHEMATICAL AND SCIENTIFIC LITERACY**

We have looked at the patterns of student performance across all participating countries for each of the three domains, reading, mathematical and scientific literacy.

The key findings for New Zealand are:

- Students perform significantly above the OECD average in all three domains. In fact, New Zealand is among the six best performing countries in terms of the mean scores in each of reading, mathematical and scientific literacy.
- In terms of reading literacy, New Zealand has the highest proportion of its students at the top level of proficiency.
- There is a common pattern of a wide spread of scores across all domains. The spread of scores is generally wide within individual schools in New Zealand. This means each school is likely to be working with a diverse range of student ability.

# General Outcomes of Learning

In addition to measures of student performance in the three literacy domains, PISA provides an opportunity to look at other general outcomes of learning such as the capacity to continue learning throughout life. These more general outcomes are important for students not only in the school environment but also for them as young adults once they have left school. Not only will they be challenged with using the knowledge and skills gained at school, they will also need to be able to acquire new knowledge and skills to deal with new circumstances in their lives.

In terms of these general outcomes, PISA 2000 surveyed students on such areas as:

- attitudes to reading and mathematical (but not scientific) literacy;
- more general engagement with reading;
- approaches to learning; and
- use of computers as a learning tool.

The outcomes discussed below are a selection of the general outcomes available from the PISA data. Additional general outcomes are discussed in the international report.

In most cases these areas are examined in relation to reading literacy, but where they are examined in relation to mathematical or scientific literacy this is stated explicitly.

To allow comparison between countries, a common scale was used to create a separate index for each of these different outcomes.

## MOTIVATION AND ENGAGEMENT

This section looks at students' reported attitudes to reading and mathematics and their more general engagement with reading. The results show that students who are most interested in reading and mathematics, and who read more, achieve better results on the respective PISA scales than do students who are less interested in these subjects.

### *Subject-related interest in reading and mathematics*

About half of the New Zealand 15-year-olds surveyed in PISA are generally positive about reading. This is in line with the average across OECD countries.

Fifty-one percent of New Zealand students agree or somewhat agree that reading is fun, 47 percent read in their spare time and 60 percent indicate that they sometimes get totally absorbed when reading.

New Zealand students are in the top third of countries on the index that summarises interest in reading based on the three above items. Generally within any country, those with a greater interest in reading achieve better results than do those with less interest. New Zealand results are consistent with this. The quarter of students who report the lowest level of interest in reading perform on average around 506 points, about the level of the OECD average. The quarter with the highest level of interest perform on average around 593 points.

In New Zealand approximately three in five (59%) students consider mathematics to be important, although fewer (42%) agree or somewhat agree that mathematics is fun and half sometimes get totally absorbed when doing mathematics. These proportions are similar to the average across OECD countries.

New Zealand students rank seventh out of 32 countries in terms of their interest in mathematics.

Gender differences in performance in reading and mathematical literacy are closely mirrored by student interest in the respective subject areas.

For reading, among New Zealand students, more girls than boys agree or somewhat agree that reading is fun (61% girls; 47% boys), read in their spare time (58% girls; 42% boys) and sometimes get totally absorbed when they read (71% girls; 59% boys).

Conversely in mathematics, more boys than girls agree or somewhat agree that mathematics is fun (49% boys; 39% girls) and that mathematics is important (69% boys; 57% girls). About equal proportions of boys (55%) and girls (53%) can get totally absorbed in mathematics.

### ***Reading activities and engagement in reading***

The index of engagement in reading is based on students' level of agreement with nine statements about their reading activities and the general importance they attach to reading including whether they, for example, read for pleasure, enjoy talking about books, visit bookstores and libraries, or consider reading a waste of time.

Generally, the way in which New Zealand students have responded to questions designed to measure their engagement in reading reflects that of the OECD country average. For example, 43 percent of New Zealand students, compared with 44 percent internationally, read only to obtain information that they need and 33 percent, compared with 35 percent internationally, agree or somewhat agree that reading is one of their favourite hobbies.

The index that allows comparison of student responses internationally to the questions on engagement in reading shows that, in virtually every country, there is a close association between engagement in reading and student performance. In New Zealand's case this is demonstrated by a 104 score point advantage in performance for those students in the top quarter of the index of engagement in reading compared with those whose answers on engagement place them in the bottom quarter of the engagement in reading index.

Looking specifically at reading for enjoyment we find a real difference in the scores for those students who report enjoying reading as opposed to those who do not. The four percent of New Zealand students who read more than two hours each day achieved, on average, 553 points. This compares with four percent and 506 points respectively for OECD countries overall. About 30 percent of New Zealand students report they do not enjoy reading at all. This is in line with the 32 percent of students internationally who report they do not enjoy reading. However, New Zealand students who report not enjoying reading at all still achieved an average of 494 points on the combined reading literacy scale, which was 20 points above their international counterparts.

The gender differences favouring girls on reading literacy are also reflected in the broader engagement of students in reading activities. On average, 37 percent of male students in New Zealand read only if they have to. This compares with 23 percent of their female counterparts.

Boys also tend to spend less time on reading for enjoyment than girls. In line with OECD averages, 27 percent of New Zealand boys report that they read more than 30 minutes for enjoyment each day compared with 40 percent of girls. The only differences demonstrated in the type of material read voluntarily by girls and boys in New Zealand relate to comic books and fiction. Twice as many boys (16%) as girls (7%) read comics several times a month or more, whereas the opposite is true for fiction (27% boys; 43% girls).

## **LEARNING STRATEGIES**

In order to look at learning strategies students were asked a series of questions about how they controlled the learning process, whether they used memorisation and/or elaboration strategies and how they worked with other students. These are explained in detail below.

In some cases links are established between use or non-use of a strategy and student performance. In these cases it should not be assumed that use or non-use of a strategy causes students to perform more or less well. They are simply related. In addition, a student is likely to use more than one strategy at the same time. This report examines the association of each strategy with student reading performance.

### ***Controlling the learning process***

PISA constructed an index of learning strategies that are seen to be associated with a student's control over the learning process. This index is based on students' level of agreement to the following statements:

- I start by figuring out what exactly I need to learn;
- I force myself to check to see if I remember what I have learned;
- I try to figure out which concepts I still haven't really understood;
- I make sure that I remember the most important things; and
- when I study and I don't understand something, I look for additional information to clarify this.

New Zealand is placed in the middle of OECD countries on this index, indicating a moderate use by our students of these control strategies.

Using self-regulating strategies is associated with student performance in reading literacy. In every country, students who use these strategies more frequently perform better on the combined reading literacy scale than those who do not. The association is particularly marked in New Zealand where the quarter of students who use these strategies for learning are, on average, a full proficiency level ahead of the quarter who use them least.

Girls report using control strategies more often than boys in New Zealand. This is the case in most OECD countries.

### ***Memorisation and elaboration***

New Zealand students are among the most frequent users of memorisation strategies. This includes students reporting that they try to memorise as much as possible of everything that might be covered or by saying the material to themselves over and over. In New Zealand those who score well in reading literacy use memorisation strategies more frequently than those who do not, although this is not the case in every country.

To assess students' elaboration strategies they were asked whether they tried to relate material to things they have learned in other subjects or to things they already know; or whether they tried to figure out how useful the information may be in the real world. Although frequent use of elaboration strategies is positively associated with performance on PISA's reading, mathematical and scientific literacy scales in all countries, in New Zealand the students who are in the top quarter of the elaboration index are on average only 19 points ahead on the combined reading literacy score than those students who are in the bottom quarter of the elaboration index.

The learning strategies of memorisation and elaboration, as reported by students, differ consistently between girls and boys. Internationally, girls generally place more emphasis on memorisation strategies in comparison with boys. In New Zealand the mean score on the memorisation index for girls is roughly double that for boys.

Conversely, internationally boys report using elaboration strategies more than girls, although in New Zealand the difference in boys and girls mean scores on this strategy is negligible.

### ***Co-operative and competitive learning***

To measure co-operative learning students were asked to state the extent to which they agreed with statements about how they work with other students. Competitive learning was measured by the extent to which they agreed with statements about whether they desired to be better (academically) than others.

Students in New Zealand report high scores on both the scale for co-operative learning and the scale for competitive learning, ranking fourth and second respectively internationally. This reflects the general tendency across OECD countries for those who identify with statements about co-operative learning also to identify with statements about competitive learning. Both learning styles are positively related to performance in the combined reading literacy scale. This is also consistent across countries.

### **COMPUTERS AS A TOOL FOR LEARNING**

Approximately two thirds (68%) of New Zealand 15-year-olds rate their computer ability as good or excellent. This compares with 56 percent of students in the OECD countries overall. Internationally, a majority of students are either comfortable or very comfortable with using a computer generally (70%; New Zealand 84%), using a computer to write a paper (69%; New Zealand 78%) and with taking a test on a computer (55%; New Zealand 63%). New Zealand students rank fourth, behind only their American, Canadian and Australian counterparts, on the index of comfort with and perceived ability to use computers.

# Contextual Factors — Key Characteristics of Students and Schools

As indicated earlier in this summary report, all students who participated in PISA 2000 were asked to complete a background questionnaire and each school principal was asked to complete a questionnaire about their school. These questionnaires provided key information about the characteristics of the students assessed and the schools that they attend. This information enables us to begin to explore the relationships between these contextual factors and student performance as measured by performance on the three domains of reading literacy, mathematical literacy and scientific literacy.

These contextual factors can be grouped into two categories. There are factors that relate to the students' family backgrounds and those that relate to the learning environment and the organisation of schooling.

The students in this study come from a wide variety of family, socio-economic and cultural backgrounds and, while students from all backgrounds achieve right across the range of scores in PISA, some background characteristics may be associated with different types of performance. Knowledge of these associations will assist educators to better understand factors that can impact on learning and to target learning strategies. It will also allow policy-makers, both within the school and at a national level, to target policies to promote higher levels of performance for these students.

To allow comparison between countries, a common scale was used to create a separate index for each of these different contextual factors.

The factors discussed below are a selection of the contextual factors available from the PISA data. Additional contextual factors are discussed in the international report.

## **STUDENTS' HOME BACKGROUND**

### ***Occupational status***

PISA captured this aspect of students' home backgrounds through information on parents' occupation. They used this information to generate a socio-economic index of parental occupational status. The higher the value on the index, the higher the occupational status of a student's parents.

Parental occupational status is a powerful predictor of student achievement in all areas. Among students in the top quarter of this socio-economic index in all countries the mean score on the combined reading literacy scale is 543 points, 43 points above the OECD's overall mean.

In New Zealand the average combined reading literacy score for students in the highest quarter of this socio-economic index is 574, which is similar to average scores for students in that quarter of the index in Australia, Finland and the United Kingdom. In terms of reading proficiency, these students are achieving, on average, well within Level 4.

By way of contrast, the average score among all students in the bottom quarter of the socio-economic index internationally is 462 points, 38 points below the OECD mean.

In New Zealand the corresponding figures are 489 points and 11 points respectively. New Zealand's results demonstrate the fact that, although students in the bottom quarter have lower mean scores than their counterparts in higher quarters, they do not necessarily fare poorly when compared with students in other countries.

Among all OECD countries, the average gap in reading performance between students who are in the top and bottom quartiles of the socio-economic index exceeds one entire proficiency level. However, the gaps in

combined reading scores between students in the top and bottom quarters of the socio-economic index differs significantly among countries.

In New Zealand the gap is relatively large. For reading and scientific literacy there are 85 points on average between those students who are in the highest and lowest quartiles of the socio-economic index. For mathematical literacy there is an 84 points difference.

A range of factors impact on students' achievement in the three literacy domains. However, the data on the association of occupational status with student performance in each of the domains is consistently demonstrated across the OECD countries.

### ***Family wealth***

The index of family wealth is based on students' reports on the availability of a number of items in their homes, including among other things the number (including none) of cellular phones, television sets, motor cars and computers in the home. The relationship between family wealth, as represented by a student's score on this index, and student performance in the three domains is mixed. Although students from families described as wealthy, on the basis of the availability of certain items in their home, typically do better than students from the least wealthy families in reading, mathematical and scientific literacy, the differences are modest in many countries and negligible or insignificant in others.

On average, students in New Zealand in the highest quarter of the family wealth index score 55 (reading literacy), 58 (scientific literacy), and 49 (mathematical literacy) points higher than do students in the lowest quarter. The OECD mean scores are 34, 36 and 41 points for each domain respectively.

### ***Social and cultural communication***

Students were asked about the frequency of communication and interaction with their parent(s). From their responses two indices were derived. The first is an index of cultural communication that is based on responses to questions about: discussing social and political issues; discussing books, films or television programmes; and listening to music together. The second is an index of social communication that is based on responses to questions about: discussing how well the student was doing at school; eating the main meal together and spending time just talking. The two indices of social and cultural communication are based on the students' assessments of the frequency, not the quality, of communication and interaction with their parent(s).

Although it is acknowledged that there are other aspects to cultural and social communication these indices have been found, from previous research, to reasonably represent cultural and social aspects of communication. Use of these aspects has also demonstrated the importance of the relationship between parental involvement and academic success. In PISA 2000, among all OECD countries, there is a strong relationship between the two indices, suggesting that parents who interact frequently about social issues also commonly do so with respect to cultural topics.

Overall, New Zealand students report relatively low levels of social, but not cultural, communication with their parent(s) compared with other OECD countries. Generally within each country, the more frequent the reported communication and interaction with their parent(s), the higher the average mean scores on the combined reading literacy scale.

### ***Parental education***

Students were asked to provide information on the level of education completed by their mother and father.

In most OECD countries, students whose mothers have completed upper secondary or tertiary education achieve higher levels of performance. In New Zealand 45 percent of the 15-year-olds in this study report

having mothers with tertiary qualifications. Of those students in all OECD countries whose mothers have tertiary qualifications, New Zealand students achieve the fourth highest combined reading literacy score, the third in mathematical literacy and seventh in scientific literacy.

New Zealand is also among the countries in which students find themselves least disadvantaged by their mothers' relative lack of education. The mean performance scores for New Zealand students whose mothers have primary and lower secondary education are above the mean scores for all students in OECD countries in this category for each of reading, mathematical and scientific literacy.

The relationship between student performance and their fathers' level of education was not examined in the international report. Mothers' education was chosen because it is commonly identified in the research literature as a stronger predictor of student performance than the fathers' education.

### **Family structure**

Students were asked to report who lives at home with them most of the time. This included mother/father, step-mother/father and male/female caregiver as well as brothers, sisters and other relations or persons.

New Zealand, along with the United Kingdom and the United States, has the highest proportion of students reporting that they live with one parent or caregiver most of the time. [In the international report these students are described as being in *single-parent families*.] In New Zealand 21 percent of students reported that they live with one parent or caregiver most of the time.

Overall, among OECD countries, the findings of this study show that students who live with one parent or caregiver most of the time perform less well in reading than their peers in other types of family environments. This is also the case in New Zealand. However, those New Zealand students who live with one parent or caregiver most of the time perform better than the OECD average and well within Level 3 proficiency.

There are likely to be a range of factors associated with family structure that may impact on student performance given that the social and economic profile of all types of family structure varies considerably. Interpretation of the above results on family structure therefore needs to be treated with some caution.

### **Place of birth**

PISA did not collect information internationally on a student's ethnic identity. [In New Zealand we collected information on student ethnicity. This will be reported in the extended national report to be published in early 2002.]

In PISA 2000 all students were asked about their place of birth and that of their parents. To enable comparisons of place of birth across countries, the OECD adopted a specific terminology in their international report to categorise where students (and their parents) were born. A student is described as:

- *native* if they, and at least one of their parents, were born in the country in which they are currently living. The term native includes both indigenous students and those that are second-generation or more.
- *non-native* if they and their parents were born outside the country in which they are currently living.
- *first-generation* if they were born in the country in which they now live but their parents were born outside that country.

Applying this terminology within New Zealand, there is a relatively high proportion (13%) of *non-native* students among its PISA participants compared with the OECD average (5%). *Non-native* means that both the student and their parents were born outside New Zealand.

There is a somewhat smaller proportion (New Zealand 6%; OECD 4%) of *first-generation* students. *First-generation* students were born in New Zealand, but their parents were born overseas.

Neither of the above two descriptions takes account of where students or their parents were born. They could be from Europe, the Pacific, Asia, or elsewhere.

In New Zealand the mean scores on the combined reading literacy scale for students categorised as *native* are significantly above those for *non-native* and *first-generation* students. This represents a difference in mean score of 30 points for *native* and *non-native* students and 31 points for *native* and *first-generation* students.

The pattern of results internationally is generally not dissimilar.

### **Language**

Students have also been classified according to the language that they speak in relation to the PISA assessments. *Majority-language* students are those who speak the language of the test or another national language or dialect most of the time while *minority-language* students are those who routinely converse with their parents and siblings in another language. For nearly all the PISA countries, *majority-language* students are, on the whole, more proficient than *minority-language* students.

New Zealand has the fifth highest proportion (10%) of *minority-language* students. On average, these students have a reading literacy mean score 72 points below their *majority-language* counterparts. This equates to one reading proficiency level. In scientific literacy the difference is similarly high at 66 points. In mathematical literacy, the difference is only 34 points in favour of *majority-language* students. *Minority-language* students average 511 points, which is just above the overall OECD mean mathematical literacy score.

## **THE LEARNING ENVIRONMENT AND THE ORGANISATION OF SCHOOLING**

The learning environment that schools as well as families provide for 15-year-old students will impact on their access to effective learning opportunities. In addition to looking at factors related to school learning environments this study also examined those aspects of school organisation that may relate to student performance.

### **School and classroom climate**

#### **Teacher support**

Students were asked about whether teachers:

- help students with their work;
- show an interest in every student's learning;
- give students an opportunity to express opinions; and
- continue to teach until students understood.

It was clear from their responses to these questions that New Zealand students consider their teachers to be supportive. In terms of where New Zealand ranked on the index measuring this construct, we were fourth and part of a grouping with Australia, Canada, Portugal, the United States and the United Kingdom.

In most countries that have an index value on the teacher support scale above the OECD mean, including New Zealand, the association between teacher support and performance in reading is low but positive.

### **Student-related factors affecting the school climate**

To look at factors affecting the school climate this study drew on information provided by both students and their school principals. Principals were asked the extent to which learning is hindered by such things as student absenteeism, students' use of alcohol or drugs, and disruption of classes by students. Students were asked how frequently certain disruptive situations occurred in class.

Although students and principals were asked to respond to different questions it is possible to indirectly compare their perspectives of the learning climate. In many countries, including New Zealand, there is a relatively high level of agreement overall between the views of students and of principals.

This study also reveals a positive relationship between the learning climate and student performance in New Zealand. Students who report fewer disruptive situations in class achieve higher scores than students who report more frequent occurrences of disruption. Similarly students in schools whose principals report fewer student-related factors hindering learning achieve higher scores than students in schools where their principals report more frequent student-related problems.

### **Principals' perceptions of teachers' morale and commitment**

Principals were asked to report on the morale and commitment among teachers in their school and this was converted into an index of teacher morale and commitment. New Zealand principals reported a relatively high morale and commitment among teachers, placing New Zealand in the top quarter of 28 OECD countries on this index.

There is no consistent relationship established between teacher morale and commitment and student performance among OECD countries. This means that high performing countries are not necessarily those whose teachers are perceived by principals to have high morale and commitment or vice versa or that countries necessarily show a positive relationship between teacher morale and commitment and student achievement.

However, within New Zealand there was some evidence that for students in the top quarter of the index of teacher morale and commitment (as gauged by principals) the combined reading literacy score is higher than for students in the lower quarter of this index.

### ***Learning outside school***

#### **Homework**

Students were asked about how long they spent on homework for language, mathematics and science courses. In New Zealand, students reported spending, on average, 4.7 hours per week on this homework. This is in line with the OECD average of 4.6 hours.

Students' investment in homework is summarised in an index that combines the weekly time students spend on homework for language, science and mathematics classes with the frequency with which students complete their homework on time. New Zealand students appear in the mid range on this index. There is a small, but positive association between a students' investment in homework (as measured on the index) and their reading achievement.

### ***Resources invested in education***

#### **The quality of schools' physical infrastructure and educational resources**

Principals were asked to respond to a series of questions about the extent to which material and educational resources hinder learning among 15-year-old students in their school. From this information two indices were developed: one for the quality of the school's physical infrastructure and the other for the quality of the schools' educational resources.

The relationship between student performance and schools' physical infrastructure and the relationship between student performance and the quality of schools' educational resources were examined. Over most OECD countries, schools' educational resources appear to be a much better predictor of performance than schools' physical infrastructure. This is the case in New Zealand, where principals generally do not report either of these aspects of their schools as being a hindrance to students' learning.

### ***Approaches to school management and financing***

#### ***School autonomy***

Principals were asked to report on, among other things, whether they had the main responsibility in their school for decision-making in various aspects of school management. These aspects included:

- appointing teachers;
- dismissing teachers;
- formulating the school budget;
- deciding on budget allocations within the school;
- establishing student disciplinary policies;
- establishing student assessment policies;
- approving student admittance to school;
- choosing which textbooks are used;
- determining the course content; and
- deciding which courses are offered.

On most of these aspects of school management, the principals' responses ranked New Zealand first, second or third among the OECD countries in terms of the percentage of students in schools where principals have at least some responsibility in making these decisions.

#### ***Public and private stakeholders***

On average across the 25 OECD countries with available data, five percent of 15-year-old students are enrolled in schools that are privately managed and predominantly privately financed (independent private schools). In New Zealand the proportion in this study is also five percent.

In most countries where these comparisons can be made, including New Zealand, students in these schools outperform public (or state) school students in reading literacy. The difference in New Zealand is statistically significant and is of the same magnitude as a full proficiency level (71 points).

However, students are usually not randomly distributed between public and private schools. Private schools may cater to a different clientele or apply more restrictive transfer or selection practices. For example private school students in New Zealand have a mean socio-economic index of occupational status that is significantly (12 points) higher than that of their state school counterparts.

# Conclusion

In this summary report we have seen that the performance of New Zealand students in each of reading literacy, mathematical literacy and scientific literacy compares very favourably with the performance of students in other OECD countries.

Many of our students have demonstrated high levels of literacy and some of our students are amongst the best in the world in terms of their performance in reading, mathematical and scientific literacy.

In addition, New Zealand students are generally well placed, in terms of some of the general outcomes of learning measured by this study, for challenges that may face them once they leave school.

A number of factors have been shown to impact on student performance. This summary report has been able to highlight only some of these factors. PISA 2000 has already provided a wealth of information about our 15-year-olds and further analysis of these data will provide us with more. To this end a more detailed national report is planned to expand on the results in this summary report as well as to explore issues relating to New Zealand-only data such as student ethnicity and school decile<sup>1</sup>.

PISA 2000 is only one of the ways in which we can find out how well our young adults are being prepared for life beyond school. Results from this study should be considered alongside all of the other information we know about our young adults in determining the needs of our students, of our education system and of our society as a whole.

## ENDNOTE

<sup>1</sup> *School decile describes groupings of schools based on their Targeted Funding for Educational Achievement (TFEA) indicator which is used to allocate funding for state schools.*

## **ACKNOWLEDGEMENTS**

We are indebted to the many students, teachers and principals who participated in this study. Their efforts and assistance have provided our country with a valuable resource.

We also wish to acknowledge the assistance from our international colleagues from the Australian Council for Educational Research (ACER) and the Statistics and Indicators Division of the Organisation for Economic Co-operation and Development (OECD) for the work done in preparing the international report from which this summary report is based.

This report has been prepared by Steve May and Fiona Sturrock with assistance from Lynne Whitney. Christabel Dillon was responsible for desktop publishing.

## **FURTHER INFORMATION**

This summary report is only a brief glimpse at the range of information available from the Programme for International Student Assessment (PISA). More detailed information about the international results, including the full international report and supporting data, for this study can be found at the international PISA web-site: [www.pisa.oecd.org](http://www.pisa.oecd.org)

More detailed results for New Zealand will be available in early 2002. This summary report and further reports and information about PISA in New Zealand are available from the Ministry of Education web-site at: [www.minedu.govt.nz/goto/pisa](http://www.minedu.govt.nz/goto/pisa).

General enquiries about the PISA study may be directed to:

Steven May  
National Project Manager PISA 2000  
Research Division  
Ministry of Education  
PO Box 1666  
Wellington

E-mail: [steve.may@minedu.govt.nz](mailto:steve.may@minedu.govt.nz)

