SCIENCE LITERACY ACHIEVEMENT: SENIOR SECONDARY SCHOOLING

Despite a recent decline in science literacy performance at the senior secondary level, New Zealand is still performing above the OECD average.

Indicator Description

Scientific literacy of 15-year-old students.

Why This Is Important

Scientific literacy assists students to participate as responsible and informed members of society, and as productive contributors to New Zealand's economy and future.

Attainment at senior secondary level contributes to preparation for successful participation in tertiary education, and the ability to contribute to, and participate in, a changing labour market and an increasingly knowledge-based society. Attainment level is also related to individual well being.
How We Are Going

Scientific literacy was a minor domain in the Programme for International Student Assessment (PISA) in 2012.

Three scientific competencies - identifying scientific issues, explaining phenomena scientifically, and using scientific evidence - and two scientific knowledge areas - knowledge of science and knowledge about science were assessed as part of the combined scientific literacy scale. Trend information for science literacy is available from 2006, 2009 and 2012. However due to changes in the way scientific literacy has been assessed, no comparison can be made with the results for PISA 2000 and 2003.

In PISA 2012, New Zealand performed above the OECD average in science (516 compared to 501). New Zealand scored significantly below 15 countries, eight of which are OECD members. Five countries (all of which were OECD members) had similar average scores to New Zealand and 44 countries (including 20 OECD members) had lower average scores than New Zealand.

Proficiency levels describe the types of science tasks that students can do. Students performing at Level 6 are adept at using their scientific knowledge in a variety of complex situations. Students performing below Level 2 have limited scientific knowledge that can only be applied in a few familiar situations. New Zealand has a slightly larger proportion of students performing at the highest levels of scientific literacy than the OECD average, with 13% reaching Level 5 or above compared to 8%. Sixteen percent of New Zealand 15 year-old students did not reach beyond the lowest level of scientific literacy (Level 1); a lower proportion than the average across the OECD countries (18%).
Figure 1: New Zealand mean performance compared to OECD average (2006-2012)

Note:
1. Error bars on the graph provide a 95 percent confidence interval for the estimate of the average.
Gender

Fifteen year-old New Zealand boys achieved a marginally higher mean scientific literacy score (518) than girls did (513) in 2012. Since 2006, girls’ mean performance has declined by 19 points. Boys’ mean performance has declined by 11 points over the same period.

Figure 2: New Zealand PISA science literacy mean scores by gender (2006-2012)

Note:
1. Error bars on the graph provide a 95 percent confidence interval for the estimate of the average.
Ethnicity

Māori and Pasifika students are priority students traditionally under-served by the education system, along with special education students, and those from low socio-economic areas. The Ministry of Education is dedicated to improving outcomes for these students.

Māori and Pasifika student performance was significantly below the OECD average. A lower proportion of Māori and Pasifika students achieved at the highest levels of proficiency in science, and these students were over-represented at the lower levels when compared to the New Zealand average.

Figure 3: New Zealand PISA science literacy mean scores, by ethnic group (2006-2012)

Note:
1. Error bars on the graph provide a 95 percent confidence interval for the estimate of the average.
Socio-economic

Improving education outcomes for students from low socio-economic areas is another priority for the Ministry of Education.

In this indicator, socio-economic status is measured using the PISA index of economic, social and cultural status (ESCS). This index is created by asking the students about their parents' occupation and education level, their access to educational resources like books and computers, and whether they had certain items in their household that are likely to be related to parental income e.g. dishwasher, pay television etc. New Zealand has an ESCS score that is similar to the OECD average.

The New Zealand students were split into quarters based on their ESCS index scores. The PISA mean science score for those in New Zealand’s lowest quarter (lowest socio-economic group) in 2012 was well below the New Zealand mean and OECD mean scores. Scores had dropped in all socio-economic groups since 2006.
Where to Find Out More

This indicator is closely linked to other national assessment programmes for reading, as well as achievement indicators for senior secondary school students, such as:

- Science literacy achievement primary schooling
- Literacy skills in the adult population
- Mathematics literacy achievement: senior secondary schooling
- Reading literacy achievement: senior secondary schooling.

The Ministry of Education has established an Iterative Best Evidence Synthesis Programme to systematically identify, evaluate, analyse, synthesise and make accessible, relevant evidence linked to a range of learner outcomes. Evidence about what works for this indicator can be found at:

- BES (Iterative Best Evidence Synthesis) Programme

References