

Mathematics achievement - middle schooling



- New Zealand is continuing its high performance in mathematical achievement at the middle schooling level, with the mean performance significantly higher than the international mean

Indicator description

Mathematics scores for Year 9 students.

Rationale

A strong foundation in mathematics is particularly important as it allows children to better learn new and advanced knowledge in mathematics, which contributes to successful participation in tertiary education and an increasingly knowledge-based society. For children, learning mathematics is integral to a great many aspects of their lives. These aspects include time, money and budgeting, being fair to others, claiming rights, recognising and generalising from symbols and patterns, using technology, interpreting information, thinking systematically and creatively, making things and solving problems.

This mathematics indicator draws on the Trends in International Mathematics and Science Study (TIMSS) assessments, providing information about the cumulative health of mathematics education after primary and intermediate school, and towards the end of the first year of secondary schooling.

Analysis and discussion

The overall mean mathematics score for New Zealand Year 9 students in 2002 was 494, significantly above the average of the 46 participating country means of 467. Australia and United States also had mean scores significantly above the international average. There was no significant change in mathematics achievement for New Zealand Year 9 students in 2002 compared to their counterparts in 1994 and 1998. Similarly Australia remains relatively unchanged between 1994 and 2002.

New Zealand Year 9 students' mean mathematics scores in TIMSS, by gender (1994, 1998, 2002)

Year	Mean (Standard Error)		
	Girls	Boys	Overall
1994	497 (5.3)	505 (6.1)	501 (4.7)
1998	495 (5.5)	487 (7.6)	491 (5.2)
2002	495 (4.8)	493 (7.0)	494 (5.3)

There were no significant gender differences in New Zealand. There were also no significant gender differences in 27 other countries, including Australia and Scotland. Girls in 2002 performed about the same as in 1994 and 1998, whereas boys' mean achievement increased from 1998 to 2002 following a decreasing between 1994 to 1998.

The proportion of students achieving at or above international benchmarks was found to be very similar over the 8-year period. The small decreases from 1994 to 1998 for the Intermediate and Low benchmarks were not of statistical significance.

New Zealand Year 9 students' mathematics score percentiles in TIMSS (1994, 1998, 2002)

International Benchmarks	New Zealand Students (%)			International Mean (%)		
	1994	1998	2002	1994	1998	2002
Advanced (625)	6	6	5	11	10	8
High (550)	28	26	24	37	31	28
Intermediate (475)	64	57	59	69	57	56
Low (400)	89	84	88	89	80	80

Note: International means are calculated only for the 35 countries which have participated in at least 2 TIMSS studies.

The TIMSS mathematics assessment has five content areas. These content areas allow each country to examine their students' strengths and weaknesses in particular areas of mathematics. The contents are Number, Algebra, Measurement, Geometry and Data. New Zealand Year 9 students achieved

significantly above the international means in all content areas, as was the case in 18 other countries including Australia and Scotland. When comparing the content areas relative to the overall New Zealand performance, New Zealand Year 9 students showed a weakness in Number, while Data was an area of relative strength. There was no change in Year 9 students' performance in any of the areas from 1998 to 2002.

Linkages

This indicator is closely linked to other national assessment programs for Mathematics, as well as achievement indicators for middle school students, such as:

- Mathematics achievement: primary schooling
- Mathematics literacy achievement: senior secondary school
- Reading achievement: middle schooling
- Science achievement: middle 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 in:

- Quality Teaching for Diverse Students in Schooling: Best Evidence Synthesis

References

Alton-Lee, A. (2003). *Quality Teaching for Diverse Students in Schooling: Best Evidence Synthesis*. Wellington, Ministry of Education.

Chamberlain, G. with Chamberlain, M. and Walker, M. (2001), *Trends in Year 9 Students' Mathematics and Science Achievement. Results from a New Zealand study based on the Third International Mathematics and Science Study*. Wellington, Ministry of Education.

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Mullis, I.V.S., et al. (2004), *TIMSS 2003 International Mathematics Report: Findings from IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*. Boston, Massachusetts: International Study Centre, Boston College.