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TIMSS 2015

Results at the Grade 4 level - Ontario

Introduction

The Trends in International Mathematics and Science Study (TIMSS) is an international assessment that measures trends in mathematics and science achievement at the Grade 4 and Grade 8/Secondary II levels. It is conducted under the auspices of the International Association for the Evaluation of Educational Achievement (IEA).

TIMSS is carried out every four years since 1995. Canada participated in TIMSS in 1995 and 1999. In 2003, 2007 and 2011, only individual provinces participated in the study so no pan-Canadian results could be reported. TIMSS 2015 marks the sixth TIMSS assessment cycle and over 330,000 students from 49 countries took part in the assessment at the Grade 4 level. In Canada, over 12,000 Grade 4 students from over 440 schools in Alberta, Manitoba, Ontario, Quebec, and Newfoundland and Labrador participated. School systems in Alberta, Ontario and Quebec were oversampled to enable the reporting of separate jurisdictional results.

In Ontario, over 4500 Grade 4 students from 151 English and French schools participated in the assessment for an overall participation rate of 90%. Because Ontario oversampled students since the first TIMSS cycle in 1995, trends in achievement are available for the past 20 years.

Main results

Mathematics

The international TIMSS scale centerpoint is fixed at 500 with four benchmark performance levels being defined as Low (400 points), Intermediate (475 points), High (550 points) and Advanced (625 points). Internationally, 75% of students reached at least the Intermediate benchmark with a slightly lower proportion in Ontario (70%).

The average scale score for Ontario in Mathematics was 512, above the international centerpoint. Five Asian countries (Singapore, Hong Kong SAR, Korea, Chinese Taipei and Japan) all scored above 590 points. Overall, 25 countries scored significantly above the Ontario average, five countries, including Canada, achieved a score statistically equivalent to Ontario and 19 countries scored significantly lower than Ontario. Ontario boys achieved significantly higher results than girls in mathematics (516 vs. 509). Results by language indicate that Ontario students who responded to the test in English achieved significantly higher results than those who responded in French (514 vs. 494 points respectively).

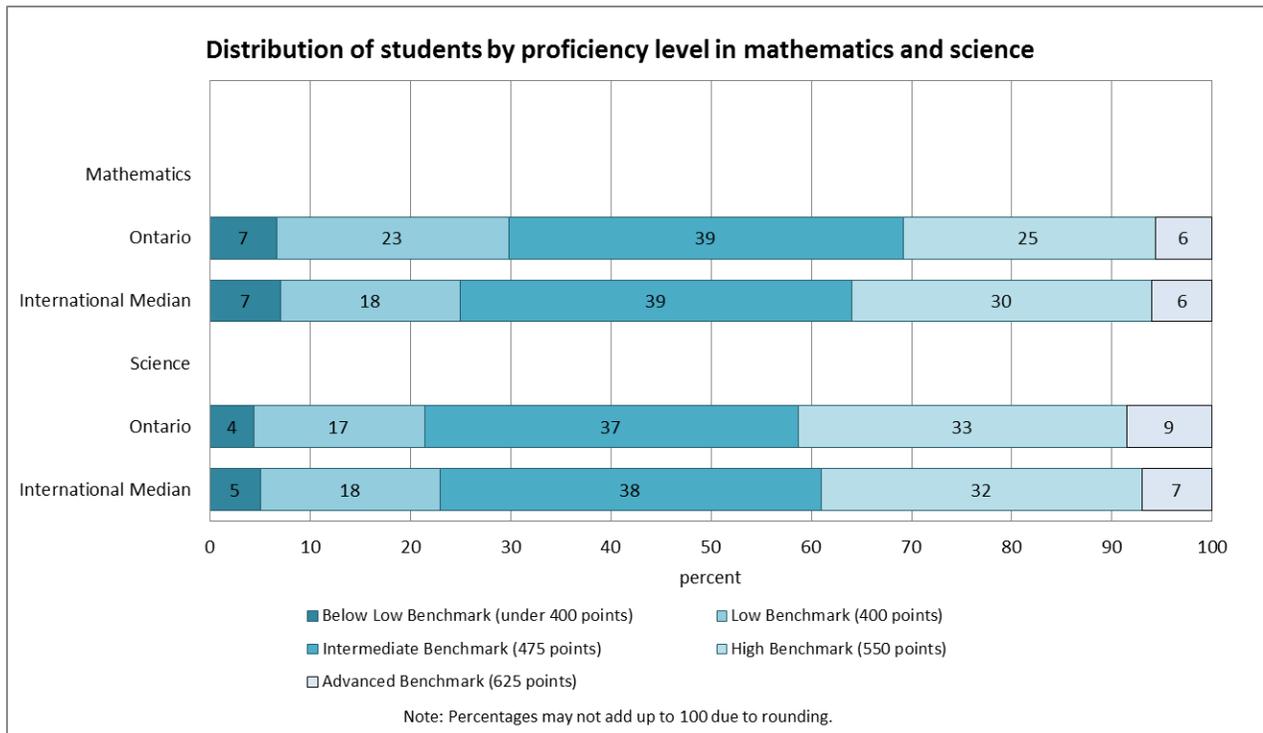
Science

With reference to the four benchmark levels described above, 79% of Ontario Grade 4 students reached the Intermediate level in science whereas 77% reached this level internationally.

The average scale score for Ontario in Science (530 points) was statistically higher than the international centerpoint of 500. Overall, 14 countries achieved a higher average score in science compared to Ontario, 11 countries, including Canada, achieved a statistically equivalent score while 22 countries scored significantly lower than Ontario. In Ontario, there is no statistical difference between boys and girls in science achievement at the Grade 4 level (528 vs. 533 respectively). Internationally, 11 countries showed significantly higher results for girls than for boys, whereas results were higher for boys in as many countries. In science, English students achieved a higher average score than French students at the Grade 4 level (533 vs. 479 respectively).

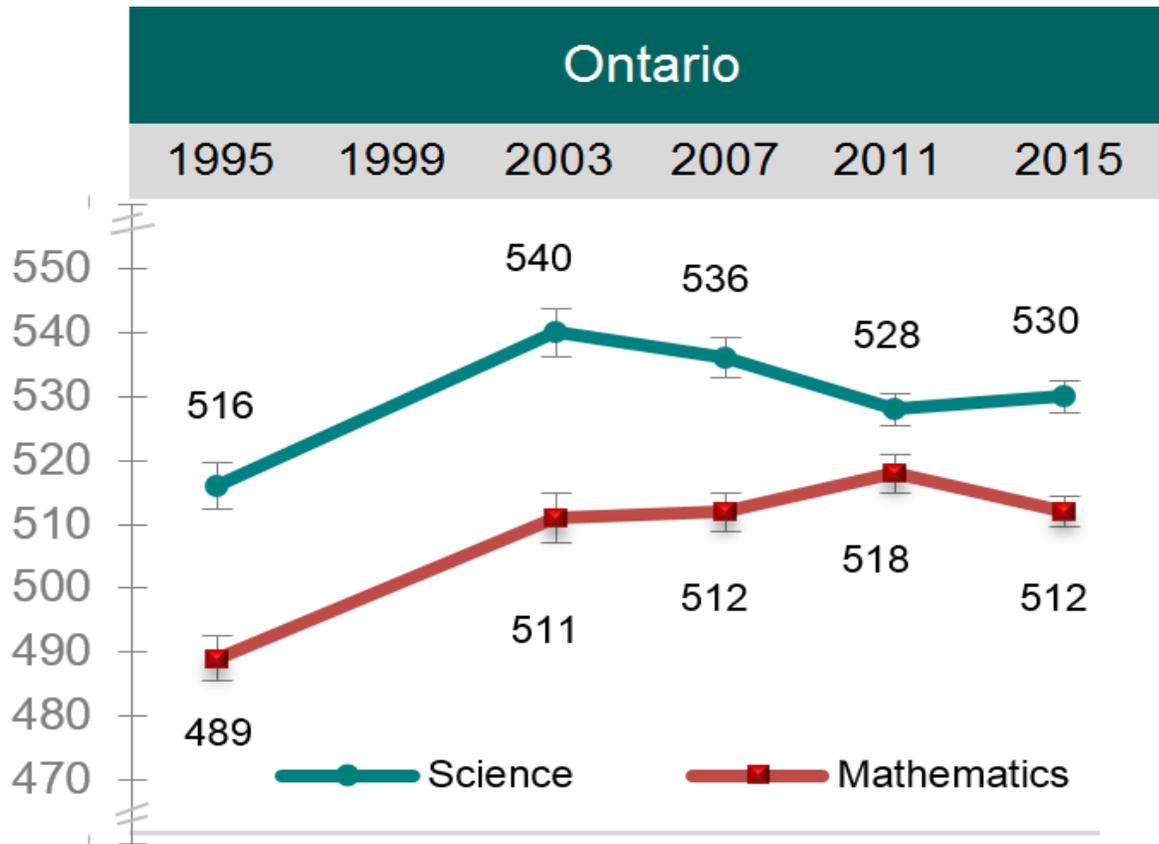
Chart 1 presents the proportion of students at each of the four proficiency levels in mathematics and in science in Canada and internationally.

Chart 1 - TIMSS 2015 – Grade 4 – Proportion of students by proficiency level in Mathematics and in Science (Ontario and International Median)



Between 1995 and 2015, Ontario Grade 4 results improved in both mathematics and science as shown in Chart 2 below.

Chart 2 - TIMSS 2015 – Grade 4 – Trends in Mathematics and Science Achievement – Ontario



School-Related Characteristics

The School Questionnaire was completed by principals or their designates in TIMSS participating schools. Although the questionnaire covers many relevant areas related to the school environment, only a select number of results related to schools with Grade 4 students are presented here for illustrative purposes.

- Across Ontario, 7% of principals in Grade 4 schools indicated that their school had a science laboratory that can be used by students. This is substantially lower than the international average of 38%.
- In Ontario, about 17% of Grade 4 students revealed that they experienced some bullying behaviours at least once a week. This is close to the international average of 15%.
- About 15% of Ontario principals in Grade 4 schools indicated that they provide free breakfast to all students in their school. This is substantially higher than the international average of 5%.

Classroom-Related Characteristics

The Teacher Questionnaire was completed by the Grade 4 teachers from the selected classrooms. It covered topics that were generic for both mathematics and science teachers related to the classroom context and subject specific topics such as the coverage of the mathematics and science curricula.

- Based on principals and teachers in Grade 4 schools, Ontario students spend more time in mathematics instruction than the international average (195 hours vs. 157 hours per year). The difference is far less notable in science with 88 hours in Ontario and 76 hours as the international average.
- The proportion of Grade 4 teachers with a master's or doctorate degree is much lower in Ontario than the international average (14% vs. over 25 %).

Home-Related Characteristics

The Early Learning Survey (Home Questionnaire) was completed by parents or guardians of participating students in Grade 4. It asked about a number of factors influencing learning in the home environment such as home resources or parental attitudes and expectations.

- In Ontario, 34% of parents of Grade 4 students reported having many home resources for learning. This is significantly higher than the international average of 17%. However, the relationship between having many or some home resources for learning and achievement in mathematics and in science is weaker in Canada than the international average.
- One-third of Ontario Grade 4 students claimed being very confident in mathematics. This is equivalent to the international average (31% vs 32% internationally). The situation is similar in science with 38% of Ontario Grade 4 students claiming being very confident in science compared to the international average of 40%. Student confidence in their mathematics and science ability is positively related to achievement.
- Across Ontario, 58% of parents of Grade 4 students reported often spending time with their child doing a number of early numeracy and literacy activities before they begin school. This is higher than the international average of 44%. These early numeracy and literacy activities are positively related to achievement at Grade 4.

Conclusion

TIMSS aims to improve the teaching and learning of mathematics and science around the world. Every four years, it provides internationally comparable rigorous and reliable data about student achievement and the learning contexts. In 2015, Ontario Grade 4 students performed better in science and in mathematics than the international average, both in absolute and in relative terms. They also showed relatively consistent results in both subject areas after a significant improvement between 1995 and 2003.

The next TIMSS assessment is scheduled for 2019.