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## **TIMSS 2015 Ontario Results at the Grade 8 Level**

### **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 has been carried out every four years since 1995. Ontario participated in TIMSS in 1995 and 1999 as part of the Canadian sample. In 2003, 2007, and 2011, only individual provinces, including Ontario participated in the study. TIMSS 2015 marks the sixth TIMSS assessment cycle, and over 250,000 students from 39 countries took part in the assessment at the Grade 8 level. In Ontario, over 4,500 Grade 8 students from 138 schools participated. Overall, the weighted participation rate was 87 per cent for Ontario after replacement schools were included, thus complying with the international guidelines.<sup>1</sup>

### **Main results**

#### *Mathematics*

The international TIMSS scale centerpoint is fixed at 500, with four benchmark performance levels defined as low (400 points), intermediate (475 points), high (550 points), and advanced (625 points). Internationally, 62 per cent of students reached at least the intermediate benchmark, with a higher proportion in Ontario (75 per cent). Only 8 countries and one benchmarking participant (Quebec) had a higher proportion of students reaching this level.

The average scale score for Ontario in mathematics was 522, above the international centerpoint. Only six countries showed a statistically significant higher average score (Singapore, Korea, Chinese Taipei, Hong Kong SAR, Japan and the Russian Federation) in addition to the province of Quebec as a benchmarking participant. Overall, seven countries, including Canada achieved a score statistically equivalent to Ontario, and 26 countries scored significantly lower than Ontario. There were no gender differences in mathematics achievement between boys and girls in Ontario (523 vs. 521). Internationally, girls achieved higher results than boys in seven countries while the opposite was true in six countries,

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<sup>1</sup> Further information on participation rates can be obtained in Appendix C of the TIMSS 2015 International Report available at <http://timssandpirls.bc.edu/index.html>

including Canada and the province of Quebec. Ontario results by language indicate that students who responded to the test in French achieved significantly higher results than those who responded in English (541 vs. 521 points, respectively).

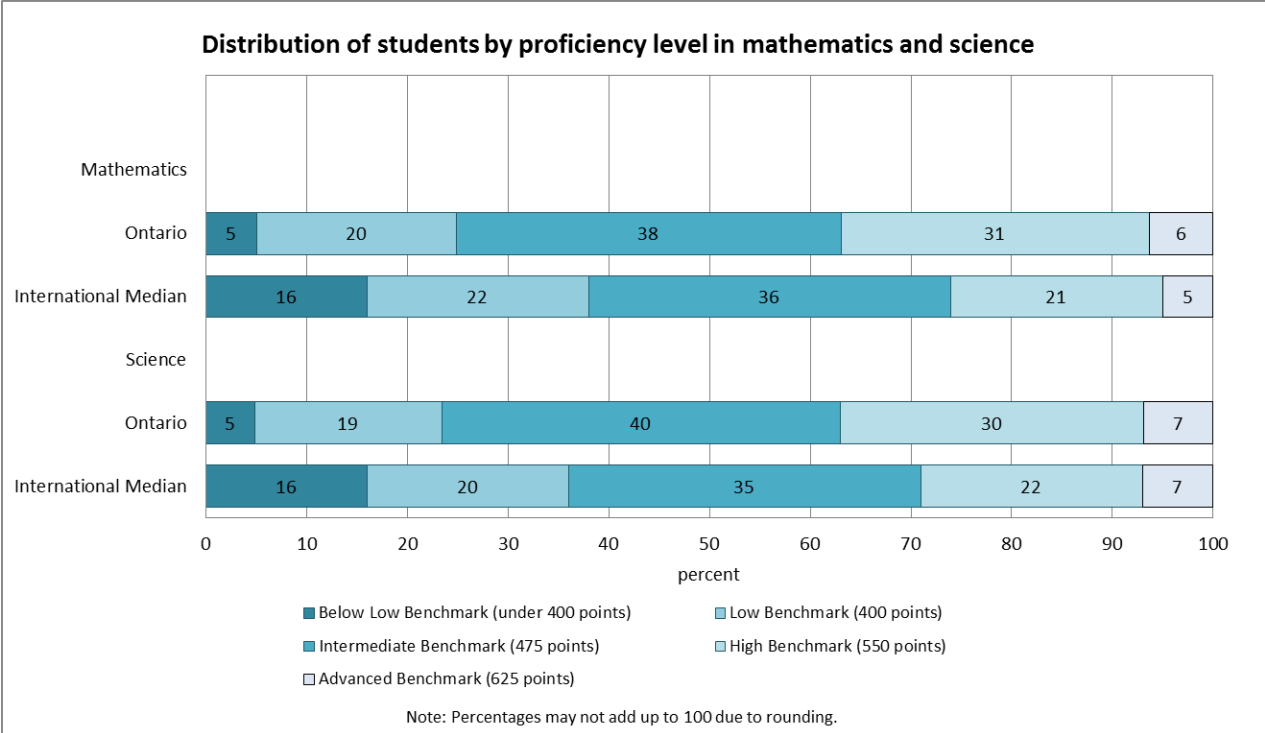
### *Science*

With reference to the four benchmark levels described above, 77 per cent of Ontario Grade 8 students reached the intermediate level in science, which is a higher proportion than the international median of 64 per cent.

The average scale score for Ontario in science (524 points) was statistically higher than the international centerpoint of 500. Overall, eight countries achieved a higher average score in science compared with Ontario, seven countries, including Canada achieved a statistically equivalent score, while 24 countries scored significantly lower than Ontario. In Ontario, there was no statistical difference between boys and girls in science achievement at the Grade 8 level (524 vs. 523, respectively). Internationally, more countries (14) showed significantly higher results for girls than for boys (5), whereas there was no gender difference in science in the other participating countries. Students who responded in English or in French achieved statistically comparable results in science at the Grade 8 level (524 vs. 523, respectively).

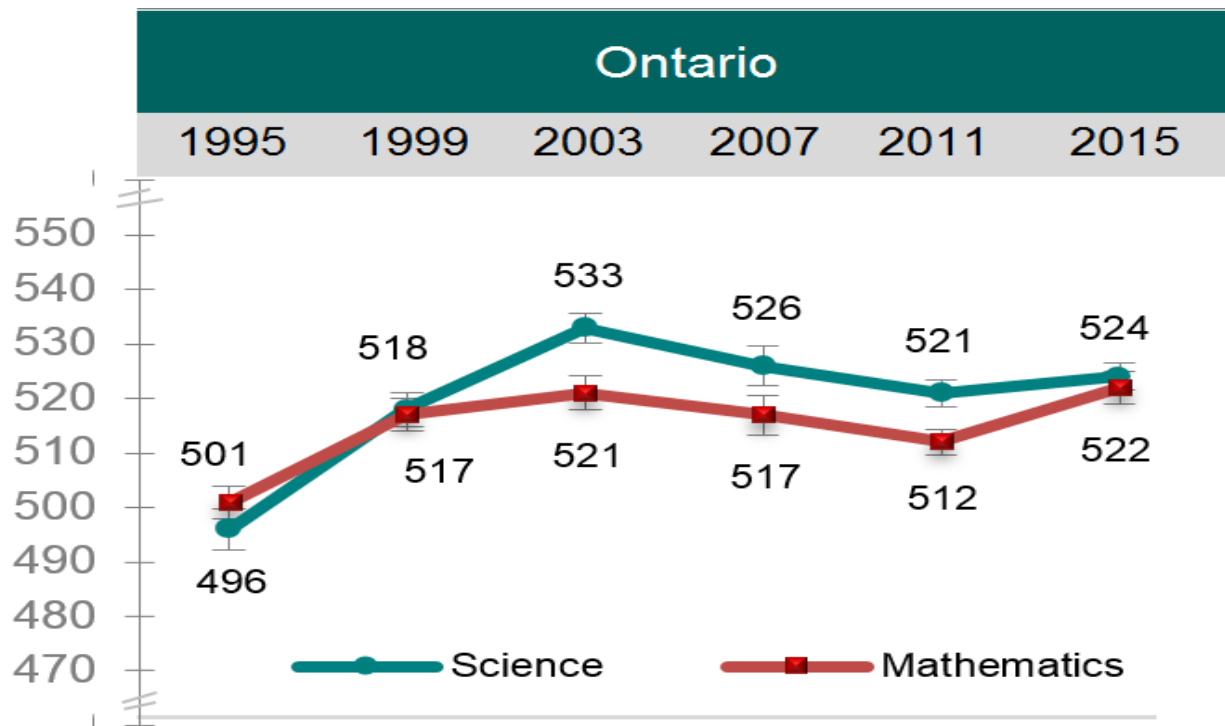
Chart 1 presents the proportion of students at each of the four proficiency levels in mathematics and in science in Canada and internationally.

### **Chart 1 – TIMSS 2015 – Grade 8 – Proportion of students by proficiency level in mathematics and in science (Canada and International Median)**



Between 1995 and 2015, Ontario Grade 8 results improved in both mathematics and science as shown in Chart 2 below. In mathematics, results have remained very stable between 2007 and 2015 while results in science have improved in 2015 compared to the previous cycle.

**Chart 2 – TIMSS 2015 – Grade 8 – Trends in Mathematics and Science Achievement – Ontario**



#### Data obtained through questionnaires

A School Questionnaire was completed by principals or their designates in schools that participated in TIMSS 2015. Although the questionnaire covers many relevant areas related to the school environment, only select results related to schools with Grade 8 students are presented below for illustrative purposes.

A Teacher Questionnaire was completed by the Grade 8 teachers from the selected classrooms. It covered topics applicable to both mathematics and science teachers and related to the classroom context and subject-specific topics such as the coverage of the mathematics and science curricula.

Grade 8 students participating in TIMSS 2015 also completed a Student Questionnaire.

Together, these questionnaires provided the information and insights presented below.

#### *School-related characteristics*

- Across Ontario, 54 per cent of principals in schools with Grade 8 students indicated that their school had a science laboratory that could be used by students. This is substantially lower than the international average of 85 per cent. On average, Ontario schools where principals responded that their Grade 8 students had a laboratory that could be used by students had an average science score of 530 compared to 514 for schools with no laboratory.

- In Ontario, the issue of intimidation and verbal abuse among students was perceived as a moderate or serious issue by almost one out of four principals at Grade 8.
- At the Grade 8 level, 17 per cent of principals in Ontario schools indicated that they provide free breakfast to all students in their school. This is substantially higher than the international average of 8 per cent.

#### *Classroom-related characteristics*

- Only 12 per cent of Ontario Grade 8 mathematics and science teachers visit often or very often another classroom to learn more about teaching, This is far less than the international average of 30 per cent.
- Over 65 per cent of Grade 8 science teachers and 64 per cent of mathematics teachers in Ontario very often feel that they are going to continue teaching for as long as they can. This is more than the international average of 50 per cent.
- In Ontario, over 70% of mathematics teachers and 68% of science teachers state that they encourage classroom discussions among students every lesson of almost every lesson. This is more than the international average of about 40%.
- In Ontario, 99 per cent of Grade 8 mathematics teachers allow students to use calculators (with or without some restrictions). Internationally, 20 per cent of teachers do not allow the use of calculators.
- In Ontario, only 11 per cent of mathematics teachers and 17 per cent of science teachers always or almost always use homework to contribute towards students' grades. This is much less than the international averages of 35 and 38 per cent respectively.

#### **Conclusion**

The aim of TIMSS is 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 learning contexts. In 2015, Ontario Grade 8 students showed higher performance levels in mathematics and science, in both absolute and relative terms, than the international average.

The next TIMSS assessment is scheduled for 2019.