

Trends in International Mathematics and Science Study (TIMSS)

The Most Ambitious Study of Educational Achievement Ever

Mathematics and Science Results for 13-year-olds in Grades 7 and 8 in 41 countries

Highlights and Implications for Ontario

- TIMSS is the largest and most ambitious study of its kind. It was conducted in the spring of 1995 under the auspices of the International Association for the Evaluation of Educational Achievement (IEA). It compares mathematics and science achievement in 41 countries. The current release includes results for 13-year-olds in Grades 7 and 8. Results were released in the spring of 1997 for 9-year-olds in Grades 3 and 4, and in the fall of 1997, for students in the final year of secondary school.
- Canada participated as a country. In addition, five provinces participated separately in order to report provincially (New Brunswick, Newfoundland, Ontario; (French and English, Alberta and British Columbia).
- The TIMSS tests were developed in a co-operative effort involving all of the countries' national research coordinators. All participating countries were given an opportunity to submit test questions which were reviewed by specialists, pilot tested, modified and re-tested.
- There were 135 science questions and 151 mathematics questions, which were divided into 8 forms or booklets. The test included multiple-choice items, short-answer questions and longer, open-response questions. Each Grade 7 and Grade 8 student in the sample wrote one of the booklets.
- There was also a practical component in which students used common mathematics and science materials to perform experiments and solve problems. The results from these practical tasks were available in the spring of 1997.
- TIMSS is designed to provide information at the national level, and at the provincial level, where provinces elected to over-sample. There are no individual school or school board reports.

Some Interesting Canadian Findings

- There were no significant differences between Canadian boys and girls in mathematics achievement and very little difference in science. Significant differences still exist in many countries.
- Most Canadian students have a positive attitude toward mathematics and consider it important to one's life. Nearly three-quarters of them enjoy the subject.
- Forty-one percent of Canadian students reported that they found science to be boring. This percentage is higher than in any country other than Australia.
- The majority of Canadian mathematics and science teachers are male.

- Teachers' workloads in Canada are higher than in most countries.
- Only about twenty-five percent of Canadian Grade 7 and 8 teachers teach mainly science. Other countries reported a higher proportion of specialist teachers.

Note: Data on these findings are not yet available for Ontario.

Achievement Results

- Singapore, Japan and Korea scored at the top for both mathematics and science, in Grade 7 and Grade 8.
- Canadian Grade 8 students scored higher than the international average in both mathematics and science.
- Canadian Grade 7 students scored higher than the international average in mathematics and science.
- In Ontario, results are reported for the province as a whole, and for French and English separately. It is possible to compare these results.

A Closer Look At Ontario

The charts below show the clusters that are formed when the results are divided into the following groups in relation to Ontario's scores: those jurisdictions that are higher than Ontario, those that are the same as Ontario and those that are lower than Ontario. These charts are different from those in the Canadian report because Ontario is now the reference point.

Notes: *Replacement schools used; **Did not meet all sampling requirements.

Ontario average score reflects a population-based weighting of French and English scores; all scores have been rounded to the nearest whole number.

Selected results are included below:

Grade 8 Mathematics

- Ontario students performed at about the international average.
- Ontario scored lower than Canada as a whole and lower than British Columbia and Alberta.
- Ontario scored the same as Newfoundland and New Brunswick, as well as a number of other countries, including England and the United States.
- Ontario students scored higher than the international average in "Data Representation, Analysis & Probability." They scored lower than the international average in "Geometry," "Algebra," and "Measurement."
- There is no statistically significant difference between the results of Ontario Francophone and Anglophone students.

Jurisdictions scoring higher than Ontario (58%–79%)	Jurisdictions scoring the same as Ontario (52%–57%)	Jurisdictions scoring below Ontario (24%–51%)
Singapore Japan Korea Hong Kong Belgium (Flemish)* Czech Republic British Columbia Slovak Republic Switzerland Austria** Hungary France Slovenia** Alberta Russian Federation Netherlands** Bulgaria** Canada Ireland Belgium (French)** Australia**	Thailand** Israel** Newfoundland Sweden Ontario (English and French) New Brunswick (English) Germany** New Zealand Norway England* United States* Denmark** Scotland**	Latvia Spain Iceland Greece** Romania** Lithuania Cyprus Portugal Iran Kuwait** Colombia** South Africa**
Average		
International	55%	
Canadian	59%	
Ontario	54%	
Ontario French	54%	
Ontario English	54%	

Grade 7 Mathematics

- Ontario students performed at about the international average.
- Ontario scored lower than Canada as a whole, and lower than Alberta.
- Ontario scored the same as British Columbia, New Brunswick, Newfoundland and a number of countries including the United States and England.
- Ontario students scored higher than the international average in "Data Representation, Analysis & Probability." They scored lower than the international average in "Geometry," "Algebra," and "Measurement".
- There is no statistically significant difference between the results of Ontario Francophone and Anglophone students.

Jurisdictions scoring higher than Ontario (52%–73%)		Jurisdictions scoring the same as Ontario (46%–52%)	Jurisdictions scoring below Ontario (26%–44%)
Singapore Japan Korea Hong Kong Belgium (Flemish)* Czech Republic Austria** Bulgaria** Netherlands** Belgium (French)* Alberta Slovak Republic Hungary Ireland Slovenia** Switzerland* Russian Federation Canada Australia**		Thailand** France Germany** United States* British Columbia Ontario (English and French) New Brunswick (English) Newfoundland England** Sweden New Zealand	Denmark** Scotland* Norway Latvia* Iceland Romania** Spain Cyprus Greece** Lithuania* Portugal Iran Mexico Colombia**
Average			
International	49%		
Canadian	52%		
Ontario	48%		
Ontario French	48%		
Ontario English	41%		

Grade 8 Science

- Ontario students performed at about the international average.
- Ontario scored lower than Canada as a whole and lower than Alberta and British Columbia.
- Ontario scored the same as Newfoundland, New Brunswick and a number of countries including the United States, France and Switzerland.
- Ontario students scored higher than the international average in "Environmental Issues and the Nature of Science" and "Physics," They scored lower than the international average in "Earth Science" and "Chemistry."
- Ontario Francophone students scored lower than Ontario Anglophone students.

Jurisdictions scoring higher than Ontario (59%–70%)		Jurisdictions scoring the same as Ontario (54%–59%)		Jurisdictions scoring below Ontario (27%–52%)	
Singapore Korea Japan Alberta Czech Republic Netherlands** British Columbia Bulgaria** Slovenia** Austria** England* Hungary Belgium (Fl)* Australia** Slovak Republic Sweden Canada		Newfoundland Ireland United States* Russian Federation Germany** New Zealand Norway Hong Kong Thailand** New Brunswick (English) Israel** Switzerland Ontario (English and French) Spain Scotland** France		Iceland Greece** Denmark** Belgium (French)** Latvia Portugal Romania** Lithuania Iran Cyprus Kuwait** Colombia** South Africa**	
Average					
International		56%			
Canadian		59%			
Ontario		56%			
Ontario French		56%			
Ontario English		49%			

Grade 7 Science

- Ontario students performed at just above the international average.
- Ontario scored lower than Alberta.
- Ontario scored the same as Canada as a whole, Newfoundland, New Brunswick, British Columbia, and a number of countries, including the United States.
- Ontario students scored higher than the international average in "Life Science," "Physics," and "Environmental Issues and the Nature of Science." There were no areas where they scored lower than the international average.
- Ontario Francophone students scored lower than Ontario Anglophone students.
- The scores were very similar for many jurisdictions, and statistically, they cluster into several groups.

Jurisdictions scoring higher than Ontario (54%–61%)		Jurisdictions scoring the same as Ontario (50%–54%)	Jurisdictions scoring below Ontario (35%–49%)
Singapore Korea Japan Alberta Czech Republic Slovenia** Belgium (FI)* England** Hungary Bulgaria** Netherlands** Austria** Australia**		Slovak Republic United States* Canada Newfoundland Hong Kong British Columbia Germany** Thailand** Ireland Ontario (English and French) Sweden New Brunswick (English) New Zealand Norway Switzerland* Russian Federation	Spain Scotland* Iceland France Belgium* Romania** Greece** Denmark** Iran Latvia* Portugal Cyprus Lithuania* Mexico Colombia**
Average			
International	50%		
Canadian	54%		
Ontario	52%		
Ontario French	52%		
Ontario English	45%		