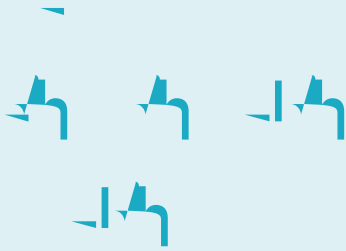



I N T R O D U C T I O N



In 1999, The Third International Mathematics and Science Study (timss) was replicated at the eighth grade. Thirty-eight countries participated in this mathematics and science assessment, known as timss-r or timss 1999. The science results are presented in this report for the 38 countries that participated in timss in 1999. Trend data also are included for 26 countries that participated in timss in 1995.







also provides information about whether the relative performance of these students has changed in the intervening years. As in the original 1995 study, TIMSS 1999 included a full range of context questionnaires and the TIMSS-R Videotape Classroom Study examining mathematics and science instructional practices in seven nations.²

In countries new to the study as well as those that participated in 1995, the data from TIMSS 1999 can help policy makers and practitioners assess their comparative standing and gauge the rigor and effectiveness of their mathematics and science programs. The aim is to improve the teaching and learning of mathematics and science for students everywhere by providing data about what types of curricula, instructional practices, and school environments result in higher student achievement.

Who Conducted TIMSS 1999?

The original TIMSS and TIMSS 1999 were conducted by the International Association for the Evaluation of Educational Achievement (IEA). With a permanent secretariat based in Amsterdam, the Netherlands, the IEA is an independent international cooperative of national research institutions and governmental research agencies. Its primary purpose is to conduct large-scale comparative studies of educational achievement to gain a deeper understanding of the effects of policies and practices within and across systems of education.

Four IEA studies in the areas of mathematics and science preceded TIMSS. These were the First International Mathematics Study, 1959-1967; the First International Science Study, 1966-1973; the Second International Mathematics Study, 1976-1987; and the Second International Science Study, 1980-1989. During the same period, the IEA conducted a number of studies that focused on other areas of schooling, including reading literacy, civics, computer applications, and early childhood education.

Funding for TIMSS 1999 was provided by the United States, the World Bank, and the participating countries. Within the United States, funding agencies include the National Center for Education Statistics of the U.S. Department of Education, the National Science Foundation, and the Department of Education's Office of Educational Research and Improvement.

² Sponsored by the United States, the TIMSS-R Videotape Classroom Study builds on the work of the first TIMSS videotape study of mathematics (Stigler, J.W., Gonzales P., Kawanaka, T., Knoll S., and Serrano, A. (1999), *The TIMSS Videotape Classroom Study: Methods and Findings from an Exploratory Research Project on Eighth-Grade Mathematics Instruction in Germany, Japan, and the United States*, NCES 1999-074, Washington, DC: National Center for Education Statistics). The first data from the Videotape Classroom Study are anticipated in late 2001.



The IEA delegated responsibility for the overall direction and management of the project to the International Study Center in the Lynch School of Education at Boston College, headed by Michael O. Martin and Ina V.S. Mullis. In carrying out the project, the International Study Center worked closely with the IEA Secretariat in Amsterdam, Statistics Canada in Ottawa, the IEA Data Processing Center in Hamburg, and





Exhibit 2 Information About the Students Tested in TIMSS 1999

	Country's Name for Grade Tested	Years of Formal Schooling ¹	Average Age of Students Tested
Australia	8 or 9	8 or 9	14.3
Belgium (Flemish)	2A & 2P	8	14.1
Bulgaria	8	8	14.8
Canada	8	8	14.0
Chile	8	8	14.4
Chinese Taipei	2nd Grade Junior High School	8	14.2
Cyprus	8	8	13.8
Czech Republic	8	8	14.4
England	Year 9	9	14.2
Finland	7	7	13.8
Hong Kong, SAR	Secondary 2	8	14.2
Hungary	8	8	14.4
Indonesia	2nd Grade Junior Secondary	8	14.6
Iran, Islamic Rep.	8	8	14.6
Israel	8	8	14.1
Italy	3rd Grade Middle School	8	14.0
Japan	2nd Grade Lower Secondary	8	14.4
Jordan	8	8	14.0
Korea, Rep. of	2nd Grade Middle School	8	14.4
Latvia (LSS)	8	8	14.5
Lithuania [‡]	9	8.5	15.2
Macedonia, Rep. of	8	8	14.6
Malaysia	Form 2	8	14.4
Moldova	8	9	14.4
Morocco	7	7	14.2
Netherlands	Secondary 2	8	14.2
New Zealand ²	Year 9	8.5 to 9.5	14.0
Philippines	1st Year High School	7	14.1
Romania	8	8	14.8
Russian Federation	8	7 or 8	14.1
Singapore	Secondary 2	8	14.4
Slovak Republic	8	8	14.3
Slovenia	8	8	14.8
South Africa	8	8	15.5
Thailand	Secondary 2	8	14.5
Tunisia	8	8	14.8
Turkey	8	8	14.2
United States	8	8	14.2
International Avg.			14.4

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

[‡] Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

¹ Years of schooling based on the number of years children in the grade level have been in formal schooling, beginning with primary education (International Standard of Classification of Education Level 1). Does not include pre-primary education.

² The official nomenclature used in New Zealand since 1996 refers to students' years of schooling rather than to a class/grade level. Year 9 students are found in a class level equivalent to grade 8.

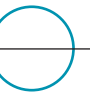


The *timss* 1999 tests were prepared in English and translated into 33 languages. A series of verification checks were conducted to ensure the comparability of the translations.¹⁰

Testing was designed so that no one student took all the items, which would have required more than three hours. Instead, exactly as in 1995, the test was assembled in eight booklets, each requiring 90 minutes to complete. Each student took only one booklet, and the items were rotated through the booklets so that each item was answered by a representative sample of students.

timss conducted a Test-Curriculum Matching Analysis in which countries examined the *timss* 1999 test to identify items measuring topics not covered in their curricula. The analysis showed that omitting such items for each country had little effect on the overall pattern of achievement results across all countries.¹¹

¹⁰ See Appendix A for more information. ¹¹ See in *wmf**B09.09 1239 Tw[(See)54.7(App4dix)5Rntries.]TJ6.6rmat8sig4.7 ing Analysis in which courmat8sn-



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	P () ¹	A C (1000) ²	L E B ³	M (= 1000) ⁴	A L R = (%) ⁵	D N C (= 1000) ⁶
Australia
Belgium (Flemish) ⁷
Bulgaria
Canada
Chile
Chinese Taipei ⁸
Cyprus ⁹
Czech Republic
England ¹⁰
Finland
Hong Kong
Hungary
Indonesia



	GNP (C, S) ¹	GNP (P, P) ²	ER, E, % N P ³	ER, D, % N P ⁴	T (% ⁵)	A C ⁶
Australia						i
Belgium (Flemish) ⁷						i
Bulgaria						
Canada						
Chile						
Chinese Taipei ⁸		i				i
Cyprus	i	i			i	i
Czech Republic						
England	i	i	i	i	i	i
Finland						i
Hong Kong						i
Hungary						
Indonesia					i	
Iran, Islamic Rep.					i	
Israel ⁹						
Italy						i
Japan						i
Jordan					i	
Korea, Rep.						
Latvia						
Lithuania						
Macedonia				i		
Malaysia						
Moldova						
Morocco				i		
Netherlands						i
New Zealand						i
Philippines						
Romania						
Russian Federation						
Singapore						
Slovak Republic						
Slovenia						
South Africa					i	
Thailand						
Tunisia					i	
Turkey						
United States	E	C			0	i

