

## Highlights

TIMSS 2003 is the third in a continuing cycle of international mathematics and science assessments conducted every four years. With the aim of improving mathematics and science education, TIMSS assesses achievement and collects a rich array of information about the educational contexts for learning these subjects. Forty-nine countries participated in TIMSS 2003, with achievement results available for 46 countries and four benchmarking participants at the eighth grade and for 25 countries and three benchmarking participants at the fourth grade (see inside spread for results). Countries that also participated in 1995 and 1999 have trend data at three points in time.

### MATHEMATICS

- In 2003, the Asian countries outperformed the other participants. Singapore was the top-performing country at both the eighth and fourth grades. At the eighth grade, other top-performers included the Republic of Korea, Hong Kong SAR, and Chinese Taipei. At the fourth grade, the other highest achievers were Hong Kong SAR, Japan, and Chinese Taipei.
- At the eighth grade, countries with significant increases in achievement over the 8-year period from 1995 to 2003 included the Republic of Korea, Hong Kong SAR, Latvia\*, the United States, and Lithuania. A number of countries had declines during this period, including Japan, Belgium (Flemish), the Russian Federation, the Slovak Republic, Sweden, Bulgaria, Norway, and Cyprus.
- At the fourth grade, countries showing significant gains between 1995 and 2003 included Hong Kong SAR, Latvia\*, England, Cyprus, New Zealand, and Slovenia. Only the Netherlands and Norway had significant decreases in achievement.
- In 2003, the gender differences in TIMSS 2003 were negligible in many countries at both the eighth and fourth grades. The trend results at the eighth grade showed a few more countries had improvement for girls than for boys.

### SCIENCE

- In 2003, at the eighth grade Singapore and Chinese Taipei had the highest performance. The Republic of Korea and Hong Kong SAR also did very well. At the fourth grade, Singapore was the top-performing country followed by Chinese Taipei, Japan, Hong Kong SAR, and England.
- At the eighth grade, countries that showed significant improvement from 1995 to 2003 included the Republic of Korea, Hong Kong SAR, the United States, Australia, Slovenia, Lithuania, and Latvia\*. Countries with significant decreases included Sweden, the Slovak Republic, Belgium (Flemish), Norway, Bulgaria, Iran, and Cyprus.
- At the fourth grade, many countries showed significant improvement between 1995 and 2003, including Singapore, Hong Kong SAR, England, Hungary, Latvia\*, New Zealand, Slovenia, Cyprus, and Iran. Declines were found in Japan, Scotland, and Norway.
- At the eighth grade, boys had significantly higher achievement than girls in the majority of countries, often by a substantial margin. Nevertheless, girls had greater improvement, on average, than boys, especially since 1999. At the fourth grade, the gender differences were negligible in most countries.

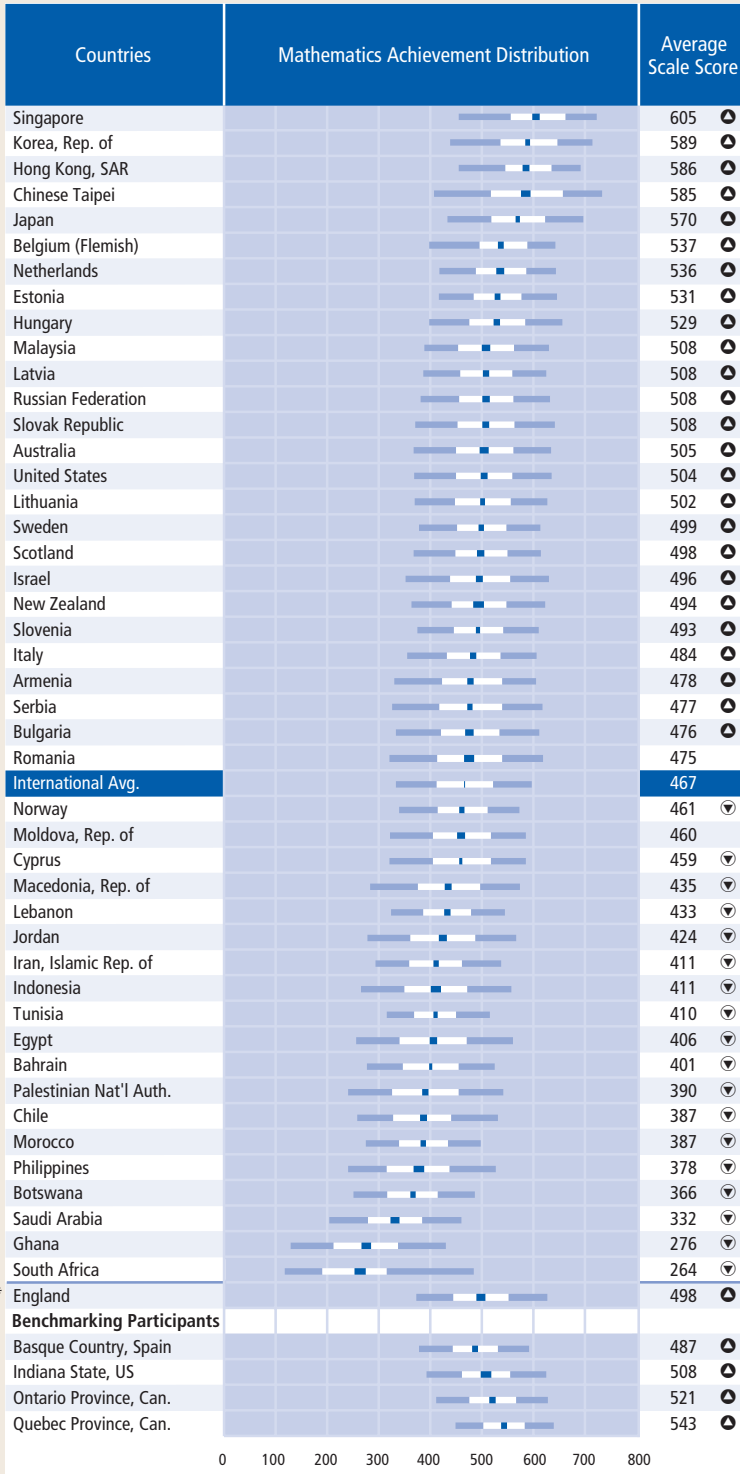
\* Latvian-speaking schools only.

### CONTEXTS FOR LEARNING MATHEMATICS AND SCIENCE

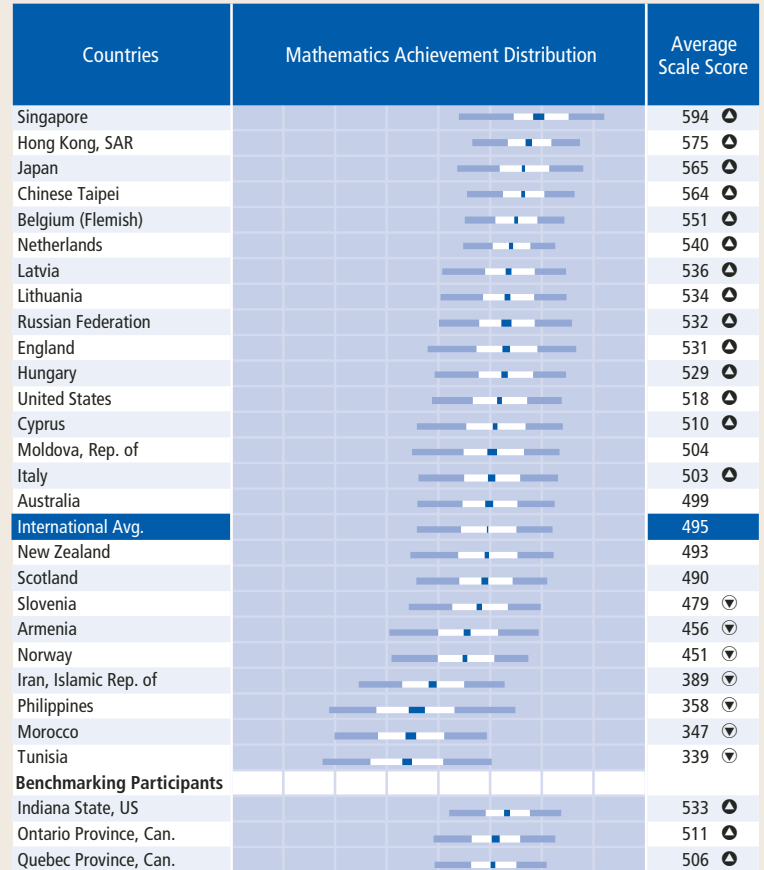
- The home context for learning was important in helping to foster higher achievement, including having more highly educated parents, speaking the language of the test at home, having more books in the home, and frequently using a computer. However, the percentages of students reporting that they did not use a computer at all varied dramatically across countries.
- Providing students the opportunity to learn the content assessed was fundamental. At least moderate curriculum coverage of the topics assessed was associated with high achievement, but, in and of itself, did not necessarily lead to success. The content also needed to be delivered in the classroom, and in an effective way.
- School environment was related to higher achievement. Students with higher achievement attended schools with positive climates for learning, with fewer students from disadvantaged homes, and where teachers and students felt safe.

Exhibit 1 Distribution of Mathematics Achievement

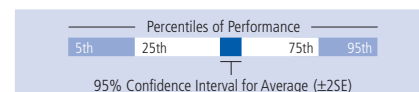
## Grade 8



## Grade 4



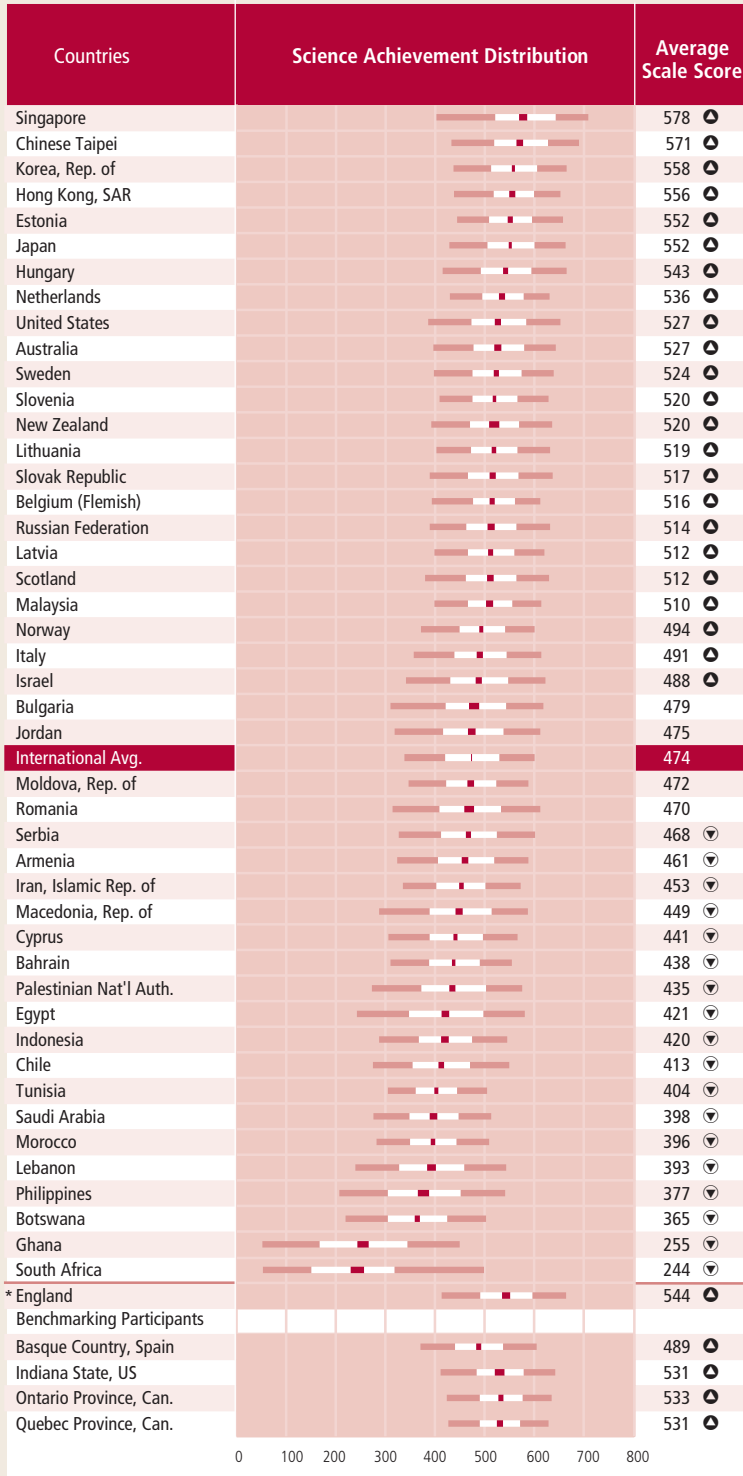
In Exhibit 1, countries are shown in decreasing order of average achievement, together with an indication of whether the country average is significantly higher or lower than the international average. The international average is the mean of the average scale scores of the participating countries (not including the Benchmarking Participants which are regional entities). The dark boxes at the midpoints of the distributions show the 95 percent confidence intervals around the average achievement in each country. The range in achievement is indicated by the 25th and 75th percentiles as well as the 5th and 95th percentiles.



\* Did not satisfy guidelines for sampling participation rates.

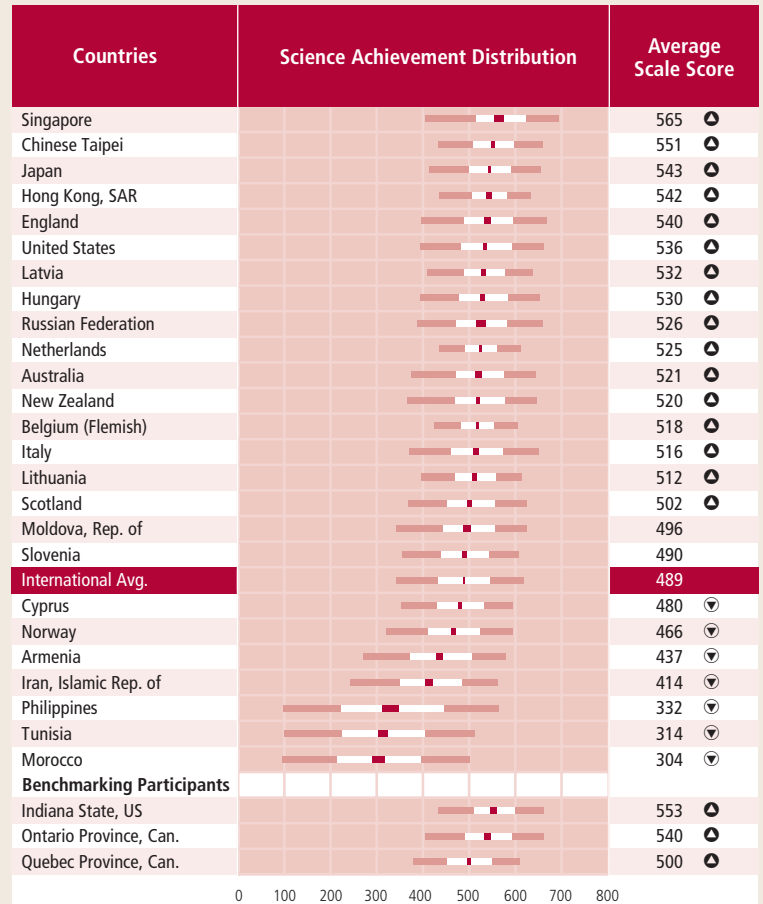
Exhibit 2 Distribution of Science Achievement

## Grade 8



\* Did not satisfy guidelines for sampling participation rates.

## Grade 4



In Exhibit 2, countries are shown in decreasing order of average achievement, together with an indication of whether the country average is significantly higher or lower than the international average. The international average is the mean of the average scale scores of the participating countries (not including the Benchmarking Participants which are regional entities). The dark boxes at the midpoints of the distributions show the 95 percent confidence intervals around the average achievement in each country. The range in achievement is indicated by the 25th and 75th percentiles as well as the 5th and 95th percentiles.



# TIMSS 2003

## Publications

Available on the TIMSS website: [timss.bc.edu](http://timss.bc.edu)



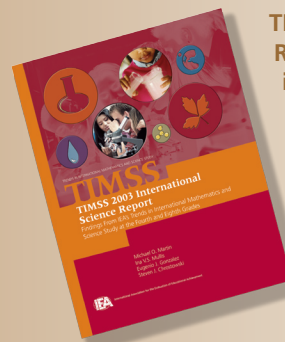
### TIMSS 2003 International Mathematics Report: Findings from IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades

Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., & Chrostowski, S.J. (2004).  
Chestnut Hill, MA: Boston College.



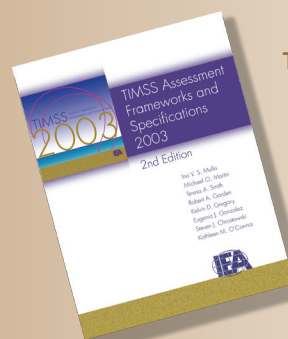
### TIMSS 2003 Technical Report

Edited by: Martin, M.O., Mullis, I.V.S., & Chrostowski, S.J. (2004).  
Chestnut Hill, MA: Boston College.



### TIMSS 2003 International Science Report: Findings from IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades

Martin, M.O., Mullis, I.V.S., Gonzalez, E.J., & Chrostowski, S.J. (2004). Chestnut Hill, MA: Boston College.



### TIMSS Assessment Frameworks and Specifications 2003 (2nd Edition)

Mullis, I.V.S., Martin, M.O., Smith, T.A., Garden, R.A., Gregory, K.D., Garden, R.A., Gonzalez, E.J., Chrostowski, S.J. & O'Connor, K.M. (2003).  
Chestnut Hill, MA: Boston College.



TIMSS is an ongoing project of the International Association for the Evaluation of Educational Achievement (IEA). The IEA is an international cooperative of more than 60 national research institutes and government agencies that has been conducting studies of cross-national achievement for more than 40 years.

### Funding

A project of this magnitude requires considerable financial support. IEA's major funding partners for TIMSS included the World Bank, the U.S. Department of Education through the National Center for Education Statistics, the UNDP, and those countries that contributed by way of fees.

The TIMSS and PIRLS International Study Center at Boston College, in the Lynch School of Education, is dedicated to conducting international comparative studies in educational achievement. Principally, it is responsible for the conduct of IEA's studies in mathematics, science, and reading—the Trends in Mathematics and Science Study (TIMSS) and the Progress in International Reading Literacy Study (PIRLS).

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