# Presentation of TIMSS 2003 Results

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## Statement by
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*Presentation of TIMSS 2003 International Results*

Good morning. We are pleased to release the results from TIMSS 2003, which is the third in a continuing cycle of international mathematics and science assessments. TIMSS stands for the Trends in International Mathematics and Science Study, which is conducted every four years at the 8th and 4th grades. The data being released today were collected in 2003 and the previous assessments were in 1995 and 1999.

Forty-nine countries participated in TIMSS 2003, with results available for 46 countries and four benchmarking participants at the 8th grade and for 25 countries and three benchmarking participants at the 4th grade. Countries that also participated in previous assessment cycles have trend data for 8th grade at three points in time and for 4th grade at two points in time (TIMSS was not conducted at 4th grade in 1999). The results are detailed in two companion reports, the TIMSS 2003 International Mathematics Report and the TIMSS 2003 Science Report.

To fulfill its primary purpose of improving mathematics and science education, TIMSS provides reliable and timely data within an international context. The test results give countries an opportunity to examine the effectiveness of their educational policies and practices in light of achievement world wide. More importantly, the report contains valuable information about a rich array of educational contexts for learning mathematics and science, including curriculum, instruction, and home and school environments.

Major findings from TIMSS 2003 follow:

- In **mathematics**, the Asian countries outperformed the other participants. Singapore was the top-performing country at both the 8th and 4th grades. At the 8th grade, other top-performers included the Republic of Korea, Hong Kong SAR, and

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Chinese Taipei. At the 4th grade, the other highest achieving countries were Hong Kong SAR, Japan, and Chinese Taipei (Exhibit 1).

- Countries that showed improved mathematics achievement between 1995 and 2003 at the 8th grade included the Republic of Korea, Hong Kong SAR, Latvia, the United States, and Lithuania. At the 4th grade, significant gains were shown by Hong Kong SAR, Latvia, England, Cyprus, New Zealand, and Slovenia. A number of countries showed declines at the 8th grade, including Japan, Belgium (Flemish), the Russian Federation, the Slovak Republic, Sweden, Bulgaria, Norway, and Cyprus. At the 4th grade, only the Netherlands and Norway had lower achievement in 2003 than in 1995 (Exhibit 2).
- In **science**, at the 8th grade, Singapore and Chinese Taipei had the highest performance. The Republic of Korea and Hong Kong SAR also did very well. At the 4th grade, Singapore was the top-performing country followed by Chinese Taipei, Japan, Hong Kong SAR, and England (Exhibit 3).
- Countries with increases in science achievement between 1995 and 2003 at the 8th grade were the Republic of Korea, Hong Kong SAR, the United States, Australia, Slovenia, Lithuania, and Latvia. Many countries showed improvement at the 4th grade, including Singapore, Hong Kong SAR, England, Hungary, Latvia, New Zealand, Slovenia, Cyprus, and Iran. At the 8th grade, declines were found in Sweden, the Slovak Republic, Belgium (Flemish), Norway, Bulgaria, Iran and Cyprus. At the 4th grade, Japan, Scotland, and Norway had lower achievement in 2003 than in 1995 (Exhibit 4).
- With the exception of science at the 8th grade, where boys had higher achievement than girls in a majority of countries, the gender differences often were negligible. There were some signs that 8th grade girls improved their achievement more than boys in both mathematics and science.

Countless studies have shown the importance of the home context for learning mathematics and science and TIMSS 2003 is no exception. Consistent with previous studies, TIMSS 2003 found that:

- Expectations about further schooling were related to mathematics and science achievement. At the 8th grade, students with more highly educated parents had higher achievement. Also, students who expected to finish university had substantially higher achievement than those without university expectations.
- Beyond the obvious role of fostering reading development, language and literacy in the home also foster mathematics and science learning. At both the 8th and 4th grades, students from homes where the language of the test was usually spoken, generally had higher achievement. Similarly, there was a clear-cut relationship between number of books in the home and achievement in mathematics and science.

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- Achievement in mathematics and science was positively related to computer usage, particularly at the 8th grade. Achievement was highest among students reporting using computers at home and at school. However, at both grades, there was dramatic variation across countries in students not using a computer at all – from only one percent to as many as two-thirds at 8th grade and three-fourths at 4th grade.

The countries participating in TIMSS 2003 spent considerable energy agreeing on the most important mathematics and science topics to be assessed. Unfortunately, it is clear that, often because of limited resources, a significant number of students around the world were not being given the opportunity to learn the content deemed to be important by the participating countries.

- In most countries, the mathematics and science curricula were defined at the national level and supported by ministry directives, instructional guides, school inspections, and recommended textbooks.

- Having at least moderate curriculum coverage of the topics tested by TIMSS 2003 appeared fundamental to high achievement, but did not, in and of itself, necessarily lead to successful learning. Countries, on average, reported that a high percentage of the content assessed was included in their curricula. Nevertheless, curriculum coverage varied considerably from country to country and across the major content areas assessed.

  (For example, on average, mathematics curriculum coverage at 8th grade ranged from 96% for number topics to 39% for data, and at 4th grade from 81% in measurement to 38% for geometry. Science coverage at 8th grade ranged from 75% of the topics for physics to 66% for earth science, and at 4th grade from 60% for life science to 50% for earth science.)

- When it came to actually teaching the curriculum, teachers reported a similar situation – relatively wide coverage in terms of the percentages of students taught the topics but with some variation across countries and content areas.

  (For example, on average, mathematics teaching coverage at the 8th grade ranged from 96% of students being taught the number topics to 46% for the data topics. At 4th grade, it averaged from 86% for measurement to 55% for geometry. Science coverage at the 8th grade averaged from 70% for life science and chemistry to 49% for environmental science. At 4th grade, it averaged from 69% for life science to 56% for physical science.)

- The textbook often was the foundation of instruction, particularly in mathematics. At both grades, two-thirds of the students in mathematics and about half in science (56%) had teachers who used a textbook as the primary basis for their lessons.

- At both grades and in both subjects, the majority of instructional time was spent with the teacher lecturing, the teacher guiding student practice, and the students working problems on their own.

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- For mathematics, school policies about calculator usage varied dramatically from country to country. For example, at the 8th grade, 10 countries permitted nearly all the students (98% or more) to use calculators, but in 7 countries less than half were permitted to do so. In general, calculator usage was not widespread at the 4th grade except in a few countries.

School environments supportive of teachers and conducive to learning were related to higher achievement in mathematics and science.

- For both mathematics and science at the 8th and 4th grades, achievement was highest for students in schools with only a small percentage (less than 10%) of the student body from economically disadvantaged homes. Achievement was substantially lower (from 43 to 57 points) for students attending schools with more than half their students from disadvantaged homes.

- At both grades, there was a strong positive relationship between achievement and the principals' perception of school climate (based on seven questions about behaviors of teachers, parents, and students). Based on the same questions, teachers had a somewhat more gloomy view of school climate than principals, but the relationship with achievement still was positive.

- Mathematics and science teachers were asked about the safety of their schools' neighborhoods, how safe they felt in their schools, and the sufficiency of security policies and practices. For each subject at both grades, there was a positive relationship between school safety and achievement. Across the grades and subjects, from 70 to 76% of the students attended schools characterized as safe by their teachers.

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