

# Appendix B

*Multiple Comparisons of Average  
Achievement in Science Content and  
Cognitive Domains*



Exhibit B.1 Multiple Comparisons of Average Achievement in Life Science (Continued)

TIMSS2007  
Science 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Colombia	Kuwait	Algeria	Tunisia	Morocco	Qatar	Yemen	Benchmarking Participants	Average Scale Score	Country
⬆	⬆	⬆	⬆	⬆	⬆	+	Massachusetts, US	582 (4.1)	Singapore
⬆	⬆	⬆	⬆	⬆	⬆	+	Minnesota, US	549 (3.0)	Italy
⬆	⬆	⬆	⬆	⬆	⬆	+	Alberta, Canada	548 (2.8)	Hungary
⬆	⬆	⬆	⬆	⬆	⬆	+	British Columbia, Canada	541 (2.1)	Chinese Taipei
⬆	⬆	⬆	⬆	⬆	⬆	+	Ontario, Canada	540 (2.5)	United States
⬆	⬆	⬆	⬆	⬆	⬆	+	Quebec, Canada	539 (4.1)	Russian Federation
⬆	⬆	⬆	⬆	⬆	⬆	+	Dubai, UAE	536 (2.2)	Netherlands
⬆	⬆	⬆	⬆	⬆	⬆	+		535 (2.1)	Latvia
⬆	⬆	⬆	⬆	⬆	⬆	+		532 (2.7)	England
⬆	⬆	⬆	⬆	⬆	⬆	+		532 (3.5)	Hong Kong SAR
⬆	⬆	⬆	⬆	⬆	⬆	+		532 (4.0)	Slovak Republic
⬆	⬆	⬆	⬆	⬆	⬆	+		531 (2.5)	Sweden
⬆	⬆	⬆	⬆	⬆	⬆	+		530 (2.0)	Japan
⬆	⬆	⬆	⬆	⬆	⬆	+		529 (2.0)	Germany
⬆	⬆	⬆	⬆	⬆	⬆	+		528 (3.4)	Australia
⬆	⬆	⬆	⬆	⬆	⬆	+		528 (5.0)	Kazakhstan
⬆	⬆	⬆	⬆	⬆	⬆	+		527 (2.4)	Denmark
⬆	⬆	⬆	⬆	⬆	⬆	+		526 (2.0)	Austria
⬆	⬆	⬆	⬆	⬆	⬆	+		520 (2.9)	Czech Republic
⬆	⬆	⬆	⬆	⬆	⬆	+		516 (1.8)	Lithuania
⬆	⬆	⬆	⬆	⬆	⬆	+		511 (2.2)	Slovenia
⬆	⬆	⬆	⬆	⬆	⬆	+		506 (2.5)	New Zealand
⬆	⬆	⬆	⬆	⬆	⬆	+		504 (2.2)	Scotland
⬆	⬆	⬆	⬆	⬆	⬆	+		489 (5.9)	Armenia
⬆	⬆	⬆	⬆	⬆	⬆	+		487 (2.5)	Norway
⬆	⬆	⬆	⬆	⬆	⬆	+		482 (2.5)	Ukraine
⬆	⬆	⬆	⬆	⬆	⬆	+		442 (4.4)	Iran, Islamic Rep. of
⬆	⬆	⬆	⬆	⬆	⬆	+		427 (3.5)	Georgia
⬆	⬆	⬆	⬆	⬆	⬆	+		410 (3.6)	El Salvador
⬆	⬆	⬆	⬆	⬆	⬆	+		408 (5.2)	Colombia
⬆	⬆	⬆	⬆	⬆	⬆	+		353 (4.9)	Kuwait
⬆	⬆	⬆	⬆	⬆	⬆	+		351 (6.2)	Algeria
⬆	⬆	⬆	⬆	⬆	⬆	+		323 (5.6)	Tunisia
⬆	⬆	⬆	⬆	⬆	⬆	+		292 (6.8)	Morocco
⬆	⬆	⬆	⬆	⬆	⬆	+		291 (1.4)	Qatar
+	+	+	+	+	+	+		+	Yemen
<b>Benchmarking Participants</b>									
⬆	⬆	⬆	⬆	⬆	⬆	+	Massachusetts, US	568 (3.5)	Massachusetts, US
⬆	⬆	⬆	⬆	⬆	⬆	+	Minnesota, US	545 (6.1)	Minnesota, US
⬆	⬆	⬆	⬆	⬆	⬆	+	Alberta, Canada	541 (3.7)	Alberta, Canada
⬆	⬆	⬆	⬆	⬆	⬆	+	British Columbia, Canada	538 (2.8)	British Columbia, Canada
⬆	⬆	⬆	⬆	⬆	⬆	+	Ontario, Canada	535 (3.7)	Ontario, Canada
⬆	⬆	⬆	⬆	⬆	⬆	+	Quebec, Canada	522 (2.7)	Quebec, Canada
⬆	⬆	⬆	⬆	⬆	⬆	+	Dubai, UAE	457 (2.8)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

⬆ Average achievement significantly higher than comparison country    ⬆ Average achievement significantly lower than comparison country



Exhibit B.2 Multiple Comparisons of Average Achievement in Physical Science (Continued)

TIMSS2007 Science 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

El Salvador	Algeria	Kuwait	Tunisia	Morocco	Qatar	Yemen	Benchmarking Participants	Average Scale Score	Country
+	+	+	+	+	+	+	Massachusetts, US	585 (3.9)	Singapore
+	+	+	+	+	+	+	Minnesota, US	564 (2.3)	Japan
+	+	+	+	+	+	+	Ontario, Canada	559 (2.5)	Chinese Taipei
+	+	+	+	+	+	+	Alberta, Canada	558 (3.5)	Hong Kong SAR
+	+	+	+	+	+	+	British Columbia, Canada	547 (4.6)	Russian Federation
+	+	+	+	+	+	+	Quebec, Canada	544 (2.4)	Latvia
+	+	+	+	+	+	+	Dubai, UAE	543 (2.7)	England
+	+	+	+	+	+	+		534 (2.3)	United States
+	+	+	+	+	+	+		530 (1.6)	Slovenia
+	+	+	+	+	+	+		529 (3.3)	Hungary
+	+	+	+	+	+	+		528 (5.8)	Kazakhstan
+	+	+	+	+	+	+		524 (2.5)	Germany
+	+	+	+	+	+	+		522 (3.1)	Australia
+	+	+	+	+	+	+		521 (3.1)	Italy
+	+	+	+	+	+	+		514 (1.4)	Lithuania
+	+	+	+	+	+	+		514 (2.4)	Austria
+	+	+	+	+	+	+		513 (4.6)	Slovak Republic
+	+	+	+	+	+	+		511 (2.8)	Czech Republic
+	+	+	+	+	+	+		508 (2.7)	Sweden
+	+	+	+	+	+	+		503 (2.3)	Netherlands
+	+	+	+	+	+	+		502 (2.5)	Denmark
+	+	+	+	+	+	+		499 (1.9)	Scotland
+	+	+	+	+	+	+		498 (2.5)	New Zealand
+	+	+	+	+	+	+		492 (5.1)	Armenia
+	+	+	+	+	+	+		475 (2.7)	Ukraine
+	+	+	+	+	+	+		469 (2.7)	Norway
+	+	+	+	+	+	+		454 (4.2)	Iran, Islamic Rep. of
+	+	+	+	+	+	+		414 (4.0)	Georgia
+	+	+	+	+	+	+		411 (4.9)	Colombia
+	+	+	+	+	+	+		392 (3.8)	El Salvador
+	+	+	+	+	+	+		377 (5.3)	Algeria
+	+	+	+	+	+	+		345 (5.2)	Kuwait
+	+	+	+	+	+	+		340 (6.4)	Tunisia
+	+	+	+	+	+	+		324 (5.5)	Morocco
+	+	+	+	+	+	+		303 (2.1)	Qatar
+	+	+	+	+	+	+		++	Yemen
<b>Benchmarking Participants</b>									
+	+	+	+	+	+	+	Massachusetts, US	560 (4.4)	Massachusetts, US
+	+	+	+	+	+	+	Minnesota, US	545 (5.4)	Minnesota, US
+	+	+	+	+	+	+	Ontario, Canada	535 (2.9)	Ontario, Canada
+	+	+	+	+	+	+	Alberta, Canada	535 (3.1)	Alberta, Canada
+	+	+	+	+	+	+	British Columbia, Canada	531 (2.6)	British Columbia, Canada
+	+	+	+	+	+	+	Quebec, Canada	513 (2.6)	Quebec, Canada
+	+	+	+	+	+	+	Dubai, UAE	467 (2.8)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

⬆ Average achievement significantly higher than comparison country    ⬇ Average achievement significantly lower than comparison country

Exhibit B.3 Multiple Comparisons of Average Achievement in Earth Science

TIMSS2007 Science 4th Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Table with columns for Country, Average Scale Score, and comparison countries (Hong Kong SAR, Singapore, Chinese Taipei, England, Russian Federation, Latvia, Sweden, Australia, Kazakhstan, United States, Austria, Slovak Republic, Japan, Italy, Germany, Netherlands, Denmark, Czech Republic, Slovenia, Hungary, New Zealand, Lithuania, Scotland, Norway, Armenia, Ukraine, Iran, Islamic Rep. of, Georgia, Colombia). Rows list countries like Hong Kong SAR, Singapore, Chinese Taipei, etc., with symbols indicating statistical significance.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone. A plus (+) sign indicates average achievement could not be accurately estimated.

Exhibit B.3 Multiple Comparisons of Average Achievement in Earth Science (Continued)

TIMSS2007  
Science 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

El Salvador	Algeria	Kuwait	Tunisia	Qatar	Morocco	Yemen	Benchmarking Participants							Average Scale Score	Country
							Massachusetts, US	Minnesota, US	Alberta, Canada	British Columbia, Canada	Ontario, Canada	Quebec, Canada	Dubai, UAE		
▲	▲	▲	▲	▲	▲	+			▲	▲	▲	▲	▲	560 (3.2)	Hong Kong SAR
▲	▲	▲	▲	▲	▲	+			▲	▲	▲	▲	▲	554 (3.3)	Singapore
▲	▲	▲	▲	▲	▲	+			▲	▲	▲	▲	▲	553 (1.9)	Chinese Taipei
▲	▲	▲	▲	▲	▲	+	▼				▲	▲	▲	538 (2.9)	England
▲	▲	▲	▲	▲	▲	+	▼				▲	▲	▲	536 (4.3)	Russian Federation
▲	▲	▲	▲	▲	▲	+	▼	▼			▲	▲	▲	536 (2.2)	Latvia
▲	▲	▲	▲	▲	▲	+	▼	▼			▲	▲	▲	535 (2.7)	Sweden
▲	▲	▲	▲	▲	▲	+	▼	▼			▲	▲	▲	534 (3.2)	Australia
▲	▲	▲	▲	▲	▲	+	▼				▲	▲	▲	534 (5.2)	Kazakhstan
▲	▲	▲	▲	▲	▲	+	▼	▼			▲	▲	▲	533 (2.6)	United States
▲	▲	▲	▲	▲	▲	+	▼	▼			▲	▲	▲	532 (1.9)	Austria
▲	▲	▲	▲	▲	▲	+	▼	▼			▲	▲	▲	530 (4.8)	Slovak Republic
▲	▲	▲	▲	▲	▲	+	▼	▼	▼		▲	▲	▲	529 (2.7)	Japan
▲	▲	▲	▲	▲	▲	+	▼	▼	▼		▲	▲	▲	526 (3.0)	Italy
▲	▲	▲	▲	▲	▲	+	▼	▼	▼		▲	▲	▲	524 (2.4)	Germany
▲	▲	▲	▲	▲	▲	+	▼	▼	▼		▲	▲	▲	524 (2.5)	Netherlands
▲	▲	▲	▲	▲	▲	+	▼	▼	▼		▲	▲	▲	522 (2.7)	Denmark
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	518 (2.6)	Czech Republic
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	517 (2.5)	Slovenia
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	517 (3.5)	Hungary
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	515 (2.6)	New Zealand
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	511 (2.5)	Lithuania
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	508 (2.5)	Scotland
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	497 (2.9)	Norway
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	479 (5.5)	Armenia
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	474 (3.1)	Ukraine
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	433 (4.1)	Iran, Islamic Rep. of
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	432 (5.0)	Georgia
	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	401 (5.6)	Colombia
	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	393 (3.3)	El Salvador
▼				▲	▲	+	▼	▼	▼	▼	▲	▲	▲	365 (5.7)	Algeria
▼				▲	▲	+	▼	▼	▼	▼	▲	▲	▲	363 (3.8)	Kuwait
▼	▼	▼		▲	▲	+	▼	▼	▼	▼	▲	▲	▲	325 (5.8)	Tunisia
▼	▼	▼	▼			+	▼	▼	▼	▼	▲	▲	▲	305 (2.2)	Qatar
▼	▼	▼	▼			+	▼	▼	▼	▼	▲	▲	▲	293 (6.2)	Morocco
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Yemen
Benchmarking Participants															
▲	▲	▲	▲	▲	▲	+			▲	▲	▲	▲	▲	558 (4.4)	Massachusetts, US
▲	▲	▲	▲	▲	▲	+			▲	▲	▲	▲	▲	547 (5.8)	Minnesota, US
▲	▲	▲	▲	▲	▲	+	▼				▲	▲	▲	544 (3.3)	Alberta, Canada
▲	▲	▲	▲	▲	▲	+	▼				▲	▲	▲	537 (2.7)	British Columbia, Canada
▲	▲	▲	▲	▲	▲	+	▼	▼			▲	▲	▲	530 (3.2)	Ontario, Canada
▲	▲	▲	▲	▲	▲	+	▼	▼	▼		▲	▲	▲	523 (2.6)	Quebec, Canada
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	471 (2.6)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▲ Average achievement significantly higher than comparison country    ▼ Average achievement significantly lower than comparison country

Exhibit B.4 Multiple Comparisons of Average Achievement in Knowing

TIMSS2007  
Science 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Singapore	Hong Kong SAR	England	Russian Federation	United States	Hungary	Latvia	Chinese Taipei	Kazakhstan	Italy	Austria	Australia	Japan	Germany	Slovak Republic	Sweden	Czech Republic	Netherlands	Denmark	Slovenia	Lithuania	Scotland	New Zealand	Armenia	Norway	Ukraine	Iran, Islamic Rep. of	Georgia	El Salvador	
Singapore	587 (4.1)																														
Hong Kong SAR	546 (3.2)	▼																													
England	543 (2.9)	▼																													
Russian Federation	542 (4.8)	▼																													
United States	541 (2.3)	▼																													
Hungary	540 (3.0)	▼																													
Latvia	540 (2.2)	▼																													
Chinese Taipei	536 (2.5)	▼	▼																												
Kazakhstan	534 (5.8)	▼																													
Italy	530 (3.9)	▼	▼	▼		▼	▼	▼																							
Austria	529 (2.0)	▼	▼	▼	▼	▼	▼	▼	▼																						
Australia	529 (3.1)	▼	▼	▼	▼	▼	▼	▼																							
Japan	528 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼																						
Germany	527 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼																						
Slovak Republic	527 (4.4)	▼	▼	▼	▼	▼	▼	▼	▼																						
Sweden	526 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼																						
Czech Republic	520 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																
Netherlands	518 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																
Denmark	516 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼															
Slovenia	511 (1.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼														
Lithuania	511 (1.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Scotland	511 (2.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼												
New Zealand	511 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											
Armenia	486 (5.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Norway	485 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Ukraine	476 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Iran, Islamic Rep. of	437 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Georgia	434 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
El Salvador	410 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Colombia	409 (5.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Kuwait	360 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Algeria	350 (5.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Tunisia	316 (5.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Qatar	304 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Morocco	291 (5.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Yemen	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<b>Benchmarking Participants</b>																															
Massachusetts, US	566 (4.4)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲		
Minnesota, US	550 (5.9)	▼																													
Alberta, Canada	549 (3.5)	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲		
British Columbia, Canada	539 (2.5)	▼										▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲		
Ontario, Canada	538 (3.4)	▼										▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲		
Quebec, Canada	516 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Dubai, UAE	463 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone. A plus (+) sign indicates average achievement could not be accurately estimated.



Exhibit B.4 Multiple Comparisons of Average Achievement in Knowing (Continued)

TIMSS2007  
Science 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Colombia	Kuwait	Algeria	Tunisia	Qatar	Morocco	Yemen	Benchmarking Participants	Average Scale Score	Country
▲	▲	▲	▲	▲	▲	+	Massachusetts, US	587 (4.1)	Singapore
▲	▲	▲	▲	▲	▲	+	Minnesota, US	546 (3.2)	Hong Kong SAR
▼	▼	▼	▼	▼	▼	+	Alberta, Canada	543 (2.9)	England
▲	▲	▲	▲	▲	▲	+	British Columbia, Canada	542 (4.8)	Russian Federation
▲	▲	▲	▲	▲	▲	+	Ontario, Canada	541 (2.3)	United States
▲	▲	▲	▲	▲	▲	+	Quebec, Canada	540 (3.0)	Hungary
▲	▲	▲	▲	▲	▲	+	Dubai, UAE	540 (2.2)	Latvia
▲	▲	▲	▲	▲	▲	+		536 (2.5)	Chinese Taipei
▲	▲	▲	▲	▲	▲	+		534 (5.8)	Kazakhstan
▲	▲	▲	▲	▲	▲	+		530 (3.9)	Italy
▲	▲	▲	▲	▲	▲	+		529 (2.0)	Austria
▲	▲	▲	▲	▲	▲	+		529 (3.1)	Australia
▲	▲	▲	▲	▲	▲	+		528 (2.2)	Japan
▲	▲	▲	▲	▲	▲	+		527 (2.2)	Germany
▲	▲	▲	▲	▲	▲	+		527 (4.4)	Slovak Republic
▲	▲	▲	▲	▲	▲	+		526 (2.5)	Sweden
▲	▲	▲	▲	▲	▲	+		520 (2.7)	Czech Republic
▲	▲	▲	▲	▲	▲	+		518 (2.5)	Netherlands
▲	▲	▲	▲	▲	▲	+		516 (2.9)	Denmark
▲	▲	▲	▲	▲	▲	+		511 (1.6)	Slovenia
▲	▲	▲	▲	▲	▲	+		511 (1.7)	Lithuania
▲	▲	▲	▲	▲	▲	+		511 (2.0)	Scotland
▲	▲	▲	▲	▲	▲	+		511 (2.5)	New Zealand
▲	▲	▲	▲	▲	▲	+		486 (5.2)	Armenia
▲	▲	▲	▲	▲	▲	+		485 (2.4)	Norway
▲	▲	▲	▲	▲	▲	+		476 (2.4)	Ukraine
▲	▲	▲	▲	▲	▲	+		437 (4.3)	Iran, Islamic Rep. of
▲	▲	▲	▲	▲	▲	+		434 (3.8)	Georgia
▲	▲	▲	▲	▲	▲	+		410 (3.9)	El Salvador
▲	▲	▲	▲	▲	▲	+		409 (5.5)	Colombia
▼	▼	▼	▼	▼	▼	+		360 (3.9)	Kuwait
▼	▼	▼	▼	▼	▼	+		350 (5.8)	Algeria
▼	▼	▼	▼	▼	▼	+		316 (5.9)	Tunisia
▼	▼	▼	▼	▼	▼	+		304 (2.3)	Qatar
▼	▼	▼	▼	▼	▼	+		291 (5.8)	Morocco
+	+	+	+	+	+	+		+	Yemen
Benchmarking Participants							Average Scale Score	Country	
▲	▲	▲	▲	▲	▲	+	566 (4.4)	Massachusetts, US	
▼	▼	▼	▼	▼	▼	+	550 (5.9)	Minnesota, US	
▲	▲	▲	▲	▲	▲	+	549 (3.5)	Alberta, Canada	
▼	▼	▼	▼	▼	▼	+	539 (2.5)	British Columbia, Canada	
▲	▲	▲	▲	▲	▲	+	538 (3.4)	Ontario, Canada	
▲	▲	▲	▲	▲	▲	+	516 (2.8)	Quebec, Canada	
▲	▲	▲	▲	▲	▲	+	463 (2.6)	Dubai, UAE	

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▲ Average achievement significantly higher than comparison country    ▼ Average achievement significantly lower than comparison country

Exhibit B.5 Multiple Comparisons of Average Achievement in Applying

TIMSS2007  
Science 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Comparison Countries																													
		Singapore	Chinese Taipei	Hong Kong SAR	Russian Federation	Japan	Italy	England	Kazakhstan	Latvia	United States	Hungary	Slovak Republic	Germany	Austria	Netherlands	Slovenia	Australia	Sweden	Czech Republic	Denmark	Lithuania	New Zealand	Scotland	Armenia	Norway	Ukraine	Iran, Islamic Rep. of	Georgia	Colombia	
Singapore	579 (3.7)																														
Chinese Taipei	556 (2.1)	▼																													
Hong Kong SAR	549 (3.0)	▼																													
Russian Federation	546 (4.7)	▼																													
Japan	542 (2.7)	▼	▼																												
Italy	539 (3.1)	▼	▼	▼																											
England	536 (2.7)	▼	▼	▼																											
Kazakhstan	536 (4.9)	▼	▼	▼																											
Latvia	535 (2.4)	▼	▼	▼	▼	▼																									
United States	533 (2.8)	▼	▼	▼	▼	▼																									
Hungary	531 (3.2)	▼	▼	▼	▼	▼																									
Slovak Republic	527 (4.4)	▼	▼	▼	▼	▼	▼																								
Germany	526 (2.2)	▼	▼	▼	▼	▼	▼	▼																							
Austria	526 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼																						
Netherlands	525 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼																					
Slovenia	525 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼																					
Australia	523 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Sweden	521 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																			
Czech Republic	516 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																		
Denmark	515 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																	
Lithuania	515 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																
New Zealand	500 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼															
Scotland	494 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼														
Armenia	487 (5.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Norway	478 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼												
Ukraine	477 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											
Iran, Islamic Rep. of	451 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼										
Georgia	424 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼									
Colombia	404 (5.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								
El Salvador	393 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							
Algeria	379 (5.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						
Kuwait	338 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Tunisia	329 (6.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼				
Morocco	311 (6.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			
Qatar	283 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			
Yemen	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<b>Benchmarking Participants</b>																															
Massachusetts, US	563 (4.4)	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	544 (5.9)	▼																													
Alberta, Canada	535 (3.7)	▼	▼	▼																											
British Columbia, Canada	533 (2.4)	▼	▼	▼	▼	▼																									
Ontario, Canada	528 (3.4)	▼	▼	▼	▼	▼	▼																								
Quebec, Canada	515 (2.7)	▼	▼	▼	▼	▼	▼	▼																							
Dubai, UAE	463 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼																						

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone. A plus (+) sign indicates average achievement could not be accurately estimated.

Exhibit B.5 Multiple Comparisons of Average Achievement in Applying (Continued)

TIMSS2007  
Science 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

								Average Scale Score	Country
El Salvador	▶	▶	▶	▶	▶	▶	+	579 (3.7)	Singapore
Algeria	▶	▶	▶	▶	▶	▶	+	556 (2.1)	Chinese Taipei
Kuwait	▶	▶	▶	▶	▶	▶	+	549 (3.0)	Hong Kong SAR
Tunisia	▶	▶	▶	▶	▶	▶	+	546 (4.7)	Russian Federation
Morocco	▶	▶	▶	▶	▶	▶	+	542 (2.7)	Japan
Qatar	▶	▶	▶	▶	▶	▶	+	539 (3.1)	Italy
Yemen	▶	▶	▶	▶	▶	▶	+	536 (2.7)	England
<b>Benchmarking Participants</b>									
Massachusetts, US	▶	▶	▶	▶	▶	▶		536 (4.9)	Kazakhstan
Minnesota, US	▶	▶	▶	▶	▶	▶		535 (2.4)	Latvia
Alberta, Canada	▶	▶	▶	▶	▶	▶		533 (2.8)	United States
British Columbia, Canada	▶	▶	▶	▶	▶	▶		531 (3.2)	Hungary
Ontario, Canada	▶	▶	▶	▶	▶	▶		527 (4.4)	Slovak Republic
Quebec, Canada	▶	▶	▶	▶	▶	▶		526 (2.2)	Germany
Dubai, UAE	▶	▶	▶	▶	▶	▶		526 (2.2)	Austria
								525 (2.2)	Netherlands
								525 (2.1)	Slovenia
								523 (3.3)	Australia
								521 (2.9)	Sweden
								516 (3.1)	Czech Republic
								515 (2.6)	Denmark
								515 (2.8)	Lithuania
								500 (2.4)	New Zealand
								494 (2.4)	Scotland
								487 (5.6)	Armenia
								478 (2.8)	Norway
								477 (3.2)	Ukraine
								451 (4.3)	Iran, Islamic Rep. of
								424 (4.1)	Georgia
								404 (5.4)	Colombia
								393 (3.6)	El Salvador
	▼	▼	▼	▼	▼	▼	+	379 (5.7)	Algeria
	▼	▼	▼	▼	▼	▼	+	338 (4.3)	Kuwait
	▼	▼	▼	▼	▼	▼	+	329 (6.3)	Tunisia
	▼	▼	▼	▼	▼	▼	+	311 (6.3)	Morocco
	▼	▼	▼	▼	▼	▼	+	283 (2.7)	Qatar
	+	+	+	+	+	+	+	+	Yemen
<b>Benchmarking Participants</b>									
	▶	▶	▶	▶	▶	▶		563 (4.4)	Massachusetts, US
	▶	▶	▶	▶	▶	▶		544 (5.9)	Minnesota, US
	▶	▶	▶	▶	▶	▶		535 (3.7)	Alberta, Canada
	▶	▶	▶	▶	▶	▶		533 (2.4)	British Columbia, Canada
	▶	▶	▶	▶	▶	▶		528 (3.4)	Ontario, Canada
	▶	▶	▶	▶	▶	▶		515 (2.7)	Quebec, Canada
	▶	▶	▶	▶	▶	▶		463 (2.6)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▶ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country

Exhibit B.6 Multiple Comparisons of Average Achievement in Reasoning

TIMSS2007  
Science 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Chinese Taipei	Singapore	Japan	Hong Kong SAR	Latvia	Russian Federation	England	United States	Australia	Hungary	Slovenia	Sweden	Italy	Denmark	Netherlands	Germany	Lithuania	Kazakhstan	Slovak Republic	Austria	Czech Republic	New Zealand	Scotland	Armenia	Norway	Ukraine	Iran, Islamic Rep. of	Colombia	Georgia
Chinese Taipei	571 (2.4)					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Singapore	568 (3.7)					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	567 (2.1)					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	561 (4.4)					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Latvia	551 (2.7)	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Russian Federation	542 (4.6)	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
England	537 (2.7)	▼	▼	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
United States	535 (2.6)	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Australia	530 (3.4)	▼	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Hungary	529 (3.7)	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Slovenia	527 (1.8)	▼	▼	▼	▼	▼	▼		▼																					
Sweden	527 (3.5)	▼	▼	▼	▼	▼	▼	▼																						
Italy	526 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼																					
Denmark	525 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼																					
Netherlands	525 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼																					
Germany	525 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼																					
Lithuania	524 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼																					
Kazakhstan	519 (5.3)	▼	▼	▼	▼	▼	▼	▼	▼																					
Slovak Republic	513 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Austria	513 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼																					
Czech Republic	510 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
New Zealand	505 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Scotland	501 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Armenia	484 (5.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Norway	480 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Ukraine	478 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Iran, Islamic Rep. of	436 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Colombia	409 (5.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Georgia	388 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
El Salvador	376 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Algeria	357 (5.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Tunisia	349 (5.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Kuwait	331 (5.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Morocco	318 (5.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Qatar	293 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Yemen	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<b>Benchmarking Participants</b>																														
Massachusetts, US	569 (6.2)					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	549 (6.4)	▼	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Ontario, Canada	541 (3.1)	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Alberta, Canada	537 (4.4)	▼	▼	▼	▼																									
British Columbia, Canada	536 (2.7)	▼	▼	▼	▼							▲			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Quebec, Canada	528 (3.3)	▼	▼	▼	▼	▼	▼																							
Dubai, UAE	462 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone. A plus (+) sign indicates average achievement could not be accurately estimated.

Exhibit B.6 Multiple Comparisons of Average Achievement in Reasoning (Continued)

TIMSS2007  
Science 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

El Salvador	Algeria	Tunisia	Kuwait	Morocco	Qatar	Yemen	Benchmarking Participants	Average Scale Score	Country
+	+	+	+	+	+	+	Massachusetts, US	571 (2.4)	Chinese Taipei
+	+	+	+	+	+	+	Minnesota, US	568 (3.7)	Singapore
+	+	+	+	+	+	+	Ontario, Canada	567 (2.1)	Japan
+	+	+	+	+	+	+	Alberta, Canada	561 (4.4)	Hong Kong SAR
+	+	+	+	+	+	+	British Columbia, Canada	551 (2.7)	Latvia
+	+	+	+	+	+	+	Quebec, Canada	542 (4.6)	Russian Federation
+	+	+	+	+	+	+	Dubai, UAE	537 (2.7)	England
+	+	+	+	+	+	+		535 (2.6)	United States
+	+	+	+	+	+	+		530 (3.4)	Australia
+	+	+	+	+	+	+		529 (3.7)	Hungary
+	+	+	+	+	+	+		527 (1.8)	Slovenia
+	+	+	+	+	+	+		527 (3.5)	Sweden
+	+	+	+	+	+	+		526 (3.8)	Italy
+	+	+	+	+	+	+		525 (3.8)	Denmark
+	+	+	+	+	+	+		525 (2.3)	Netherlands
+	+	+	+	+	+	+		525 (2.3)	Germany
+	+	+	+	+	+	+		524 (2.4)	Lithuania
+	+	+	+	+	+	+		519 (5.3)	Kazakhstan
+	+	+	+	+	+	+		513 (4.9)	Slovak Republic
+	+	+	+	+	+	+		513 (2.3)	Austria
+	+	+	+	+	+	+		510 (2.9)	Czech Republic
+	+	+	+	+	+	+		505 (2.9)	New Zealand
+	+	+	+	+	+	+		501 (2.2)	Scotland
+	+	+	+	+	+	+		484 (5.3)	Armenia
+	+	+	+	+	+	+		480 (3.2)	Norway
+	+	+	+	+	+	+		478 (3.0)	Ukraine
+	+	+	+	+	+	+		436 (4.3)	Iran, Islamic Rep. of
+	+	+	+	+	+	+		409 (5.1)	Colombia
+	+	+	+	+	+	+		388 (4.9)	Georgia
+	+	+	+	+	+	+		376 (4.0)	El Salvador
+	+	+	+	+	+	+		357 (5.8)	Algeria
+	+	+	+	+	+	+		349 (5.3)	Tunisia
+	+	+	+	+	+	+		331 (5.4)	Kuwait
+	+	+	+	+	+	+		318 (5.4)	Morocco
+	+	+	+	+	+	+		293 (2.9)	Qatar
+	+	+	+	+	+	+		++	Yemen
<b>Benchmarking Participants</b>									
+	+	+	+	+	+	+	Massachusetts, US	569 (6.2)	Massachusetts, US
+	+	+	+	+	+	+	Minnesota, US	549 (6.4)	Minnesota, US
+	+	+	+	+	+	+	Ontario, Canada	541 (3.1)	Ontario, Canada
+	+	+	+	+	+	+	Alberta, Canada	537 (4.4)	Alberta, Canada
+	+	+	+	+	+	+	British Columbia, Canada	536 (2.7)	British Columbia, Canada
+	+	+	+	+	+	+	Quebec, Canada	528 (3.3)	Quebec, Canada
+	+	+	+	+	+	+	Dubai, UAE	462 (2.6)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▲ Average achievement significantly higher than comparison country    ▼ Average achievement significantly lower than comparison country

Exhibit B.7 Multiple Comparisons of Average Achievement in Biology

TIMSS2007 Science 8th Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Table with 28 columns (Country and Average Scale Score) and 50 rows. Rows include countries like Singapore, Japan, etc., and Benchmarking Participants like Massachusetts, US, etc. Each cell contains a score and a comparison symbol.

SOURCE: IEAs Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone.









Exhibit B.9 Multiple Comparisons of Average Achievement in Physics

TIMSS2007 Science 8th Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Table with columns for Country, Average Scale Score, and comparison countries (Singapore, Korea, Rep. of, Japan, Chinese Taipei, England, Hungary, Czech Republic, Hong Kong SAR, Slovenia, Russian Federation, Australia, Sweden, Lithuania, Armenia, United States, Scotland, Ukraine, Italy, Malaysia, Jordan, Norway, Israel, Iran, Islamic Rep. of, Malta, Serbia, Bulgaria, Bahrain, Bosnia and Herzegovina, Romania). Rows include various countries and benchmarking participants like Massachusetts, US.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone.





















