

Appendix B

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

Exhibit B.1 Multiple Comparisons of Average Achievement in Life 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.

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

SOURCE: IEA-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.


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

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

Benchmarking Participants
Massachusetts, US
Minnesota, US
Alberta, Canada
British Columbia, Canada
Ontario, Canada
Quebec, Canada
Dubai, UAE

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country



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Exhibit B.2 Multiple Comparisons of Average Achievement in Physical 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.

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

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

Note: 5% of these comparisons would be statistically significant by chance alone.
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Exhibit B.2 Multiple Comparisons of Average Achievement in Physical Science (Continued)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.

El Salvador	Algeria	Kuwait	Tunisia	Morocco	Qatar	Yemen	Benchmarking Participants	Average Scale Score	Country
Massachusetts, US	Minnesota, US	Ontario, Canada	Alberta, Canada	British Columbia, Canada	Quebec, Canada	Dubai, UAE			
▲	▲	▲	▲	▲	▲	▲	▲	585 (3.9)	Singapore
▲	▲	▲	▲	▲	▲	▲	▲	564 (2.3)	Japan
▲	▲	▲	▲	▲	▲	▲	▲	559 (2.5)	Chinese Taipei
▲	▲	▲	▲	▲	▲	▲	▲	558 (3.5)	Hong Kong SAR
▲	▲	▲	▲	▲	▲	▲	▼	547 (4.6)	Russian Federation
▲	▲	▲	▲	▲	▲	▲	▼	544 (2.4)	Latvia
▲	▲	▲	▲	▲	▲	▲	▼	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
▲	▲	▲	▲	▲	▲	▲	▼	392 (3.8)	Colombia
▼	▼	▼	▼	▼	▼	▼	▼	377 (5.3)	El Salvador
▼	▼	▼	▼	▼	▼	▼	▼	345 (5.2)	Algeria
▼	▼	▼	▼	▼	▼	▼	▼	340 (6.4)	Kuwait
▼	▼	▼	▼	▼	▼	▼	▼	324 (5.5)	Tunisia
▼	▼	▼	▼	▼	▼	▼	▼	303 (2.1)	Morocco
+	+	+	+	+	+	+	+	++	Qatar
+	+	+	+	+	+	+	+	++	Yemen

Benchmarking Participants

▲	▲	▲	▲	▲	▲	+	560 (4.4)
▲	▲	▲	▲	▲	▲	+	545 (5.4)
▲	▲	▲	▲	▲	▲	+	535 (2.9)
▲	▲	▲	▲	▲	▲	+	535 (3.1)
▲	▲	▲	▲	▲	▲	+	531 (2.6)
▲	▲	▲	▲	▲	▲	+	513 (2.6)
▲	▲	▲	▲	▲	▲	+	467 (2.8)

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country

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

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.

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

SOURCE: IEA-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.


TIMSS & PIRLS
 International Study Center
 Lynch School of Education, Boston College

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

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.

Benchmarking Participants	Massachusetts, US	Minnesota, US	Alberta, Canada	British Columbia, Canada	Ontario, Canada	Quebec, Canada	Dubai, UAE	Average Scale Score	Country										
									El Salvador	Algeria	Kuwait	Tunisia	Qatar	Morocco	Yemen	El Salvador	Algeria	Kuwait	Tunisia
▲	▲	▲	▲	▲	▲	▲	▲	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	Massachusetts, US	Minnesota, US	Alberta, Canada	British Columbia, Canada	Ontario, Canada	Quebec, Canada	Dubai, UAE	Average Scale Score
▲	▲	▲	▲	▲	▲	▲	▲	558 (4.4)
▲	▲	▲	▲	▲	▲	▲	▲	547 (5.8)
▲	▲	▲	▲	▲	▲	▲	▲	544 (3.3)
▼	▲	▲	▲	▲	▲	▲	▲	537 (2.7)
▼	▼	▼	▲	▲	▲	▲	▲	530 (3.2)
▼	▼	▼	▲	▲	▲	▲	▲	523 (2.6)
▼	▼	▼	▼	▲	▲	▲	▲	471 (2.6)

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country

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



TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Exhibit B.4 Multiple Comparisons of Average Achievement in Knowing
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.

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	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Benchmarking Participants																														
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.


TIMSS & PIRLS
 International Study Center
 Lynch School of Education, Boston College

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

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.

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
▼ ▼ ▼ ▼ ▼ ▼ ▼ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	Massachusetts, US	360 (3.9)	Kuwait
▼ ▼ ▼ ▼ ▼ ▼ ▼ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	Minnesota, US	350 (5.8)	Algeria
▼ ▼ ▼ ▼ ▼ ▼ ▼ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	Alberta, Canada	316 (5.9)	Tunisia
▼ ▼ ▼ ▼ ▼ ▼ ▼ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	British Columbia, Canada	304 (2.3)	Qatar
▼ ▼ ▼ ▼ ▼ ▼ ▼ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	Ontario, Canada	291 (5.8)	Morocco
+	+	+	+	+	+	+	Quebec, Canada	+	Yemen
+	+	+	+	+	+	+	Dubai, UAE	+	

Benchmarking Participants

▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	▲ ▲ ▲ ▲ ▲ ▲ ▲ +	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

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country

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

Exhibit B.5 Multiple Comparisons of Average Achievement in Applying
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.

Country	Average Scale Score	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	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Benchmarking Participants																													
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.


TIMSS & PIRLS
 International Study Center
 Lynch School of Education, Boston College

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

El Salvador	Algeria	Kuwait	Tunisia	Morocco	Qatar	Yemen	Benchmarking Participants	Average Scale Score	Country
▲	▲	▲	▲	▲	▲	▲	Massachusetts, US	579 (3.7)	Singapore
▲	▲	▲	▲	▲	▲	▲	Minnesota, US	556 (2.1)	Chinese Taipei
▲	▲	▲	▲	▲	▲	▲	Alberta, Canada	549 (3.0)	Hong Kong SAR
▲	▲	▲	▲	▲	▲	▲	British Columbia, Canada	546 (4.7)	Russian Federation
▲	▲	▲	▲	▲	▲	▲	Ontario, Canada	542 (2.7)	Japan
▲	▲	▲	▲	▲	▲	▲	Quebec, Canada	539 (3.1)	Italy
▲	▲	▲	▲	▲	▲	▲	Dubai, UAE	536 (2.7)	England
▲	▲	▲	▲	▲	▲	▲		536 (4.9)	Kazakhstan
▲	▲	▲	▲	▲	▲	▲		535 (2.4)	Latvia
▲	▲	▲	▲	▲	▲	▲		533 (2.8)	United States
▲	▲	▲	▲	▲	▲	▲		531 (3.2)	Hungary
▲	▲	▲	▲	▲	▲	▲		527 (4.4)	Slovak Republic
▲	▲	▲	▲	▲	▲	▲		526 (2.2)	Germany
▲	▲	▲	▲	▲	▲	▲		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

Benchmarking Participants
Massachusetts, US
Minnesota, US
Alberta, Canada
British Columbia, Canada
Ontario, Canada
Quebec, Canada
Dubai, UAE

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country

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

Exhibit B.6 Multiple Comparisons of Average Achievement in Reasoning
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.

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	525 (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	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Benchmarking Participants																														
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-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.



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

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.

	El Salvador	Algeria	Tunisia	Kuwait	Morocco	Qatar	Yemen	Benchmarking Participants						Average Scale Score	Country	
								Massachusetts, US	Minnesota, US	Ontario, Canada	Alberta, Canada	British Columbia, Canada	Quebec, Canada	Dubai, UAE		
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	571 (2.4)	Chinese Taipei
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	568 (3.7)	Singapore
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	567 (2.1)	Japan
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	561 (4.4)	Hong Kong SAR
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	551 (2.7)	Latvia
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	542 (4.6)	Russian Federation
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	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

Benchmarking Participants

▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	569 (6.2)	Massachusetts, US
▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	549 (6.4)	Minnesota, US
▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	541 (3.1)	Ontario, Canada
▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	537 (4.4)	Alberta, Canada
▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	536 (2.7)	British Columbia, Canada
▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	528 (3.3)	Quebec, Canada
▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	462 (2.6)	Dubai, UAE

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country

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

Exhibit B.7 Multiple Comparisons of Average Achievement in Biology
TIMSS2007 **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.

Country	Average Scale Score																												
	Singapore	Japan	Chinese Taipei	Korea, Rep. of	England	Hungary	Czech Republic	United States	Slovenia	Hong Kong SAR	Lithuania	Russian Federation	Australia	Sweden	Italy	Scotland	Armenia	Norway	Thailand	Jordan	Ukraine	Serbia	Bahrain	Israel	Malaysia	Bulgaria	Bosnia and Herzegovina	Turkey	Syrian Arab Republic
Singapore	564 (4.2)	▲ ▲ ▲ ▲																											
Japan	553 (1.9)	▼																											
Chinese Taipei	549 (3.4)	▼																											
Korea, Rep. of	548 (1.9)	▼																											
England	541 (4.4)	▼ ▽																											
Hungary	534 (2.7)	▼ ▽ ▽ ▽																											
Czech Republic	531 (2.1)	▼ ▽ ▽ ▽																											
United States	530 (2.8)	▼ ▽ ▽ ▽																											
Slovenia	530 (2.3)	▼ ▽ ▽ ▽																											
Hong Kong SAR	527 (4.6)	▼ ▽ ▽ ▽																											
Lithuania	527 (2.3)	▼ ▽ ▽ ▽																											
Russian Federation	525 (3.6)	▼ ▽ ▽ ▽																											
Australia	518 (3.4)	▼ ▽ ▽ ▽																											
Sweden	515 (2.4)	▼ ▽ ▽ ▽																											
Italy	502 (3.0)	▼ ▽ ▽ ▽																											
Scotland	495 (3.2)	▼ ▽ ▽ ▽																											
Armenia	490 (5.9)	▼ ▽ ▽ ▽																											
Norway	487 (2.3)	▼ ▽ ▽ ▽																											
Thailand	478 (4.5)	▼ ▽ ▽ ▽																											
Jordan	478 (3.8)	▼ ▽ ▽ ▽																											
Ukraine	477 (3.4)	▼ ▽ ▽ ▽																											
Serbia	474 (3.2)	▼ ▽ ▽ ▽																											
Bahrain	473 (2.0)	▼ ▽ ▽ ▽																											
Israel	472 (4.2)	▼ ▽ ▽ ▽																											
Malaysia	469 (5.8)	▼ ▽ ▽ ▽																											
Bulgaria	467 (6.0)	▼ ▽ ▽ ▽																											
Bosnia and Herzegovina	464 (3.0)	▼ ▽ ▽ ▽																											
Turkey	462 (3.4)	▼ ▽ ▽ ▽																											
Syrian Arab Republic	459 (2.7)	▼ ▽ ▽ ▽																											
Romania	459 (3.2)	▼ ▽ ▽ ▽																											
Malta	453 (1.7)	▼ ▽ ▽ ▽																											
Tunisia	452 (2.2)	▼ ▽ ▽ ▽																											
Iran, Islamic Rep. of	449 (3.6)	▼ ▽ ▽ ▽																											
Cyprus	447 (1.9)	▼ ▽ ▽ ▽																											
Colombia	434 (3.7)	▼ ▽ ▽ ▽																											
Indonesia	428 (3.1)	▼ ▽ ▽ ▽																											
Georgia	423 (3.9)	▼ ▽ ▽ ▽																											
Kuwait	419 (2.6)	▼ ▽ ▽ ▽																											
Oman	414 (3.1)	▼ ▽ ▽ ▽																											
Algeria	411 (1.9)	▼ ▽ ▽ ▽																											
Saudi Arabia	407 (2.4)	▼ ▽ ▽ ▽																											
Egypt	406 (3.4)	▼ ▽ ▽ ▽																											
Lebanon	405 (6.2)	▼ ▽ ▽ ▽																											
Palestinian Nat'l Auth.	402 (4.1)	▼ ▽ ▽ ▽																											
El Salvador	398 (3.0)	▼ ▽ ▽ ▽																											
Morocco	395 (3.5)	▼ ▽ ▽ ▽																											
Botswana	359 (2.9)	▼ ▽ ▽ ▽																											
Qatar	318 (1.7)	▼ ▽ ▽ ▽																											
Ghana	304 (4.9)	▼ ▽ ▽ ▽																											
Benchmarking Participants																													
Massachusetts, US	563 (4.3)	▲ ▲ ▲ ▲																											
Minnesota, US	555 (5.2)	▲ ▲ ▲ ▲																											
Ontario, Canada	537 (3.8)	▼ ▽ ▽ ▽																											
British Columbia, Canada	535 (3.2)	▼ ▽ ▽ ▽																											
Quebec, Canada	513 (2.9)	▼ ▽ ▽ ▽																											
Basque Country, Spain	498 (2.9)	▼ ▽ ▽ ▽																											
Dubai, UAE	485 (3.4)	▼ ▽ ▽ ▽																											

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

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


TIMSS & PIRLS
 International Study Center
 Lynch School of Education, Boston College

Exhibit B.7 Multiple Comparisons of Average Achievement in Biology (Continued)

TIMSS2007 8th Grade Science

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.

	Romania	Malta	Tunisia	Iran, Islamic Rep. of Cyprus	Colombia	Indonesia	Georgia	Kuwait	Oman	Algeria	Saudi Arabia	Egypt	Lebanon	Palestinian Nat'l Auth.	El Salvador	Morocco	Botswana	Qatar	Ghana	Benchmarking Participants	Massachusetts, US	Minnesota, US	Ontario, Canada	British Columbia, Canada	Quebec, Canada	Basque Country, Spain	Dubai, UAE	Average Scale Score	Country
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	564 (4.2)	Singapore							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	553 (1.9)	Japan							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	549 (3.4)	Chinese Taipei							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	548 (1.9)	Korea, Rep. of							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	541 (4.4)	England							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	534 (2.7)	Hungary							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	531 (2.1)	Czech Republic							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	530 (2.8)	United States							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	530 (2.3)	Slovenia							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	527 (4.6)	Hong Kong SAR							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	527 (2.3)	Lithuania							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	525 (3.6)	Russian Federation							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	518 (3.4)	Australia							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	515 (2.4)	Sweden							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	502 (3.0)	Italy							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	495 (3.2)	Scotland							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	490 (5.9)	Armenia							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	487 (2.3)	Norway							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	478 (4.5)	Thailand							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	478 (3.8)	Jordan							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	477 (3.4)	Ukraine							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	474 (3.2)	Serbia							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	473 (2.0)	Bahrain							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	472 (4.2)	Israel							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	469 (5.8)	Malaysia							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	467 (6.0)	Bulgaria							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	464 (3.0)	Bosnia and Herzegovina							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	462 (3.4)	Turkey							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	459 (2.7)	Syrian Arab Republic							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	459 (3.2)	Romania							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	453 (1.7)	Malta							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	452 (2.2)	Tunisia							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	449 (3.6)	Iran, Islamic Rep. of Cyprus							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	447 (1.9)	Colombia							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	434 (3.7)	Indonesia							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	428 (3.1)	Georgia							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	423 (3.9)	Kuwait							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	419 (2.6)	Oman							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	414 (3.1)	Algeria							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	411 (1.9)	Saudi Arabia							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	407 (2.4)	Egypt							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	406 (3.4)	Lebanon							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	405 (6.2)	Palestinian Nat'l Auth.							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	402 (4.1)	El Salvador							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	398 (3.0)	Morocco							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	395 (3.5)	Botswana							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	359 (2.9)	Qatar							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	318 (1.7)	Ghana							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	304 (4.9)								
	Benchmarking Participants																												
	Massachusetts, US	Minnesota, US	Ontario, Canada	British Columbia, Canada	Quebec, Canada	Basque Country, Spain	Dubai, UAE	563 (4.3)																					
	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	555 (5.2)								
	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	537 (3.8)							
	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	535 (3.2)							
	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	513 (2.9)							
	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	498 (2.9)							
	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	485 (3.4)							

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country



TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

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

Exhibit B.8 Multiple Comparisons of Average Achievement in Chemistry

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.

Country	Average Scale Score																			
	Chinese Taipei	Singapore	Japan	Slovenia	Hungary	Korea, Rep. of	Czech Republic	Russian Federation	England	Hong Kong SAR	United States	Lithuania	Australia	Sweden	Scotland	Jordan	Ukraine	Norway	Italy	Malaysia
Chinese Taipei	573 (4.2)	▲ ▲ ▲ ▲	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○
Singapore	560 (4.1)	▼	▲ ▲ ▲ ▲	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○
Japan	551 (1.9)	▼	▼	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○
Slovenia	539 (2.5)	▼	▼	▼																
Hungary	536 (3.5)	▼	▼	▼																
Korea, Rep. of	536 (2.4)	▼	▼	▼																
Czech Republic	535 (2.7)	▼	▼	▼																
Russian Federation	535 (3.7)	▼	▼	▼																
England	534 (4.0)	▼	▼	▼																
Hong Kong SAR	517 (4.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
United States	510 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Lithuania	507 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Australia	505 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Sweden	499 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Scotland	497 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Jordan	491 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Ukraine	490 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Norway	483 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Italy	481 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Malaysia	479 (5.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Armenia	478 (6.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Bulgaria	472 (6.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Bahrain	468 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Bosnia and Herzegovina	468 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Israel	467 (4.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Serbia	467 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Romania	463 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Iran, Islamic Rep. of	463 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Thailand	462 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Malta	461 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Tunisia	458 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Cyprus	452 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Syrian Arab Republic	450 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Lebanon	447 (5.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Turkey	435 (5.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Indonesia	421 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Colombia	420 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Georgia	418 (4.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Kuwait	418 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Oman	416 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Morocco	416 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Algeria	414 (1.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Palestinian Nat'l Auth.	413 (4.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Egypt	413 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Saudi Arabia	390 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
El Salvador	377 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Botswana	371 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Ghana	342 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Qatar	322 (1.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Benchmarking Participants																				
Massachusetts, US	540 (4.6)	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Minnesota, US	519 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲
British Columbia, Canada	505 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Ontario, Canada	505 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Quebec, Canada	497 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Dubai, UAE	493 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Basque Country, Spain	472 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼

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

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



Exhibit B.8 Multiple Comparisons of Average Achievement in Chemistry (Continued)

TIMSS2007 **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.

Malta	Tunisia	Cyprus	Syrian Arab Republic	Lebanon	Turkey	Indonesia	Colombia	Georgia	Kuwait	Oman	Morocco	Algeria	Palestinian Nat'l Auth.	Egypt	Saudi Arabia	El Salvador	Botswana	Ghana	Qatar	Benchmarking Participants	Country	Average Scale Score
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Massachusetts, US	Chinese Taipei	573 (4.2)
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Minnesota, US	Singapore	560 (4.1)
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	British Columbia, Canada	Japan	551 (1.9)
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Ontario, Canada	Slovenia	539 (2.5)
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Quebec, Canada	Hungary	536 (3.5)
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Dubai, UAE	Korea, Rep. of	535 (2.7)
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Basque Country, Spain	Czech Republic	535 (3.7)
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Basque Country, Spain	Russian Federation	534 (4.0)
▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Massachusetts, US	England	517 (4.6)
▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Minnesota, US	Hong Kong SAR	510 (2.7)
▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	British Columbia, Canada	United States	507 (2.3)
▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Ontario, Canada	Lithuania	505 (3.6)
▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Quebec, Canada	Australia	499 (2.4)
▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Dubai, UAE	Sweden	497 (3.2)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Scotland	491 (4.1)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Jordan	490 (3.3)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Ukraine	483 (2.2)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Norway	481 (2.9)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Italy	479 (5.0)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Malaysia	478 (6.3)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Armenia	472 (6.1)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Bulgaria	468 (2.4)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Bahrain	468 (2.9)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Bosnia and Herzegovina	467 (4.6)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Israel	467 (3.7)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Serbia	463 (4.0)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Romania	463 (3.5)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Iran, Islamic Rep. of	462 (4.1)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Thailand	461 (2.1)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Malta	458 (2.5)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Tunisia	452 (2.5)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Cyprus	450 (2.9)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Syrian Arab Republic	447 (5.5)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Lebanon	435 (5.2)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Turkey	421 (3.4)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Indonesia	420 (3.1)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Colombia	418 (4.6)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Georgia	418 (3.8)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Kuwait	416 (3.6)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Oman	416 (3.0)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Morocco	414 (1.7)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Algeria	413 (4.2)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Palestinian Nat'l Auth.	413 (4.0)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Egypt	390 (2.5)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Saudi Arabia	377 (3.2)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	El Salvador	371 (2.4)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Botswana	342 (4.9)
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	Basque Country, Spain	Ghana	322 (1.8)
Benchmarking Participants																						
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Massachusetts, US	540 (4.6)	
▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Minnesota, US	519 (4.9)	
▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	British Columbia, Canada	505 (2.7)	
▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Ontario, Canada	505 (3.4)	
▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Quebec, Canada	497 (3.1)	
▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Dubai, UAE	493 (3.5)	
▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Basque Country, Spain	472 (3.5)	

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country



TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

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

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.

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

Exhibit B.9 Multiple Comparisons of Average Achievement in Physics (Continued)

TIMSS2007 **8th** **Grade**
Science

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.

Thailand	Cyprus	Syrian Arab Republic	Turkey	Oman	Kuwait	Indonesia	Tunisia	Lebanon	Georgia	Palestinian Nat'l Auth.	Egypt	Saudi Arabia	Colombia	Morocco	Algeria	El Salvador	Botswana	Qatar	Ghana	Benchmarking Participants	Average Scale Score	Country	
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Massachusetts, US	575 (3.9)	Singapore	
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Ontario, Canada	571 (2.4)	Korea, Rep. of	
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	British Columbia, Canada	558 (1.9)	Japan	
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Minnesota, US	554 (3.7)	Chinese Taipei	
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Basque Country, Spain	545 (4.0)	England	
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Quebec, Canada	541 (3.2)	Hungary	
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Dubai, UAE	537 (2.1)	Czech Republic	
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	528 (4.8)	Hong Kong SAR
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	524 (2.0)	Slovenia
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	519 (4.0)	Russian Federation
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	508 (4.2)	Australia
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	506 (2.7)	Sweden
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	505 (2.9)	Lithuania
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	503 (5.6)	Armenia
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	503 (2.7)	United States
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	494 (3.7)	Scotland
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	492 (3.9)	Ukraine
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	489 (3.1)	Italy
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	484 (5.7)	Malaysia
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	479 (4.2)	Jordan
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	475 (3.0)	Norway
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	472 (4.6)	Israel
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	470 (3.6)	Iran, Islamic Rep. of
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	470 (1.7)	Malta
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	467 (3.0)	Serbia
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	466 (5.6)	Bulgaria
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	466 (1.5)	Bahrain
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	463 (3.1)	Bosnia and Herzegovina
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	458 (3.4)	Romania
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	458 (4.2)	Thailand
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	458 (2.8)	Cyprus
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	447 (2.7)	Syrian Arab Republic
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	445 (4.3)	Turkey
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	443 (2.9)	Oman
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	438 (2.8)	Kuwait
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	432 (3.1)	Indonesia
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	432 (2.5)	Tunisia
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	431 (5.1)	Lebanon
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	416 (5.8)	Georgia
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	414 (3.7)	Palestinian Nat'l Auth.
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	413 (3.3)	Egypt
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	408 (2.3)	Saudi Arabia
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	407 (3.5)	Colombia
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	405 (3.1)	Morocco
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	397 (2.2)	Algeria
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	380 (3.5)	El Salvador
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	351 (3.2)	Botswana
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	347 (2.1)	Qatar
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	276 (5.8)	Ghana
Benchmarking Participants																							
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	535 (5.0)	Massachusetts, US
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	520 (4.1)	Ontario, Canada
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	517 (2.8)	British Columbia, Canada
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	514 (4.8)	Minnesota, US
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	493 (3.4)	Basque Country, Spain
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	492 (3.4)	Quebec, Canada
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	489 (3.4)	Dubai, UAE

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country



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

Exhibit B.10 Multiple Comparisons of Average Achievement in Earth Science

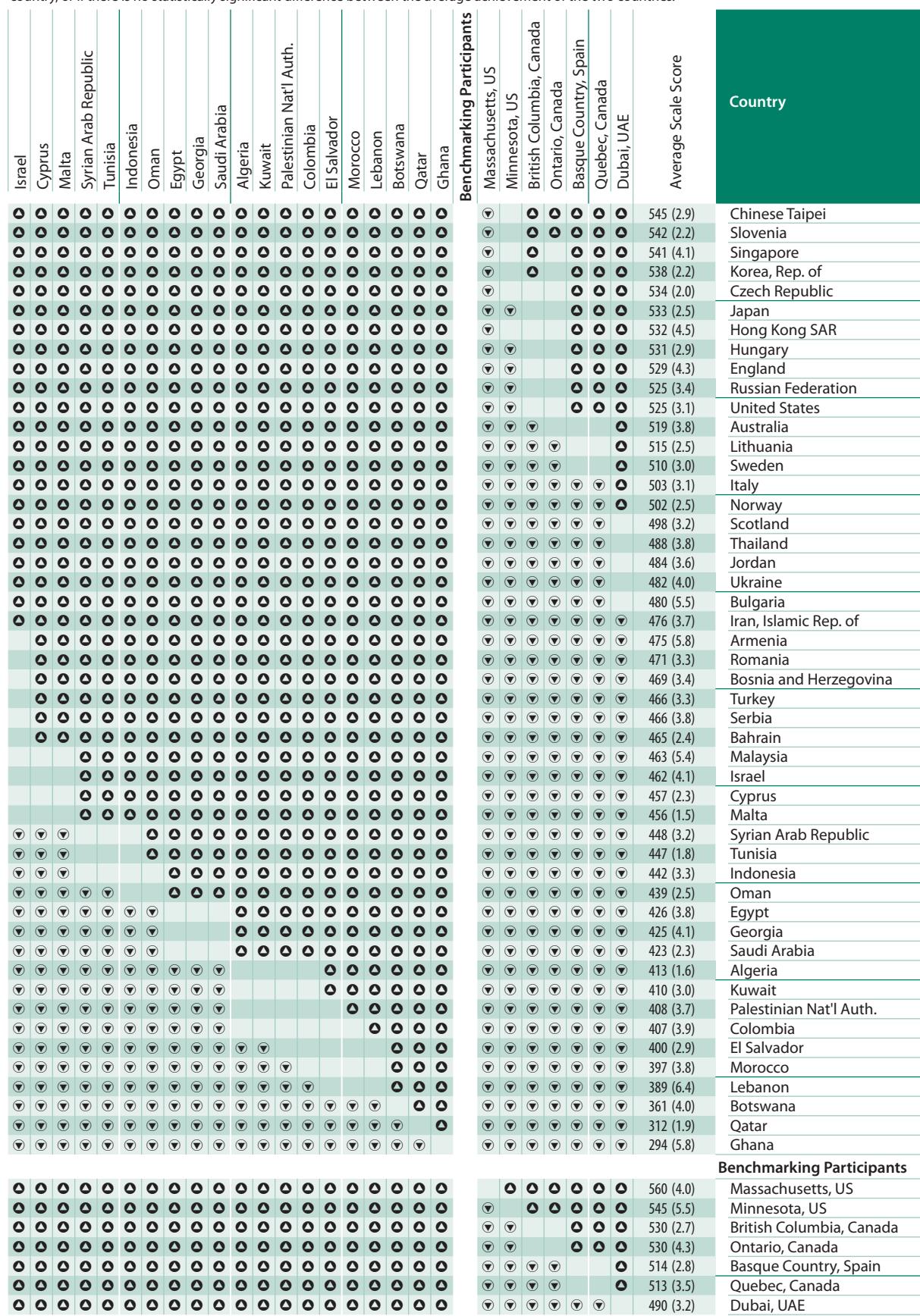
TIMSS2007 Science **8th** Grade

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.

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

Exhibit B.10 Multiple Comparisons of Average Achievement in Earth Science (Continued)**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.



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


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Exhibit B.11 Multiple Comparisons of Average Achievement in Knowing

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.

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

Exhibit B.11 Multiple Comparisons of Average Achievement in Knowing (Continued)

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.

	Benchmarking Participants	Average Scale Score	Country	
Israel	Massachusetts, US	565 (3.5)	Chinese Taipei	
Romania	Minnesota, US	554 (4.5)	Singapore	
Tunisia	British Columbia, Canada	543 (2.0)	Korea, Rep. of	
Georgia	Ontario, Canada	534 (4.3)	Russian Federation	
Cyprus	Quebec, Canada	534 (2.2)	Japan	
Malta	Dubai, UAE	533 (2.0)	Slovenia	
Egypt	Basque Country, Spain	533 (2.1)	Czech Republic	
Kuwait		532 (4.5)	Hong Kong SAR	
Oman		530 (4.9)	England	
Indonesia		524 (3.0)	Hungary	
Colombia		513 (2.4)	Lithuania	
Saudi Arabia		512 (2.9)	United States	
Algeria		505 (2.3)	Sweden	
Palestinian Nat'l Auth.		501 (3.1)	Australia	
Lebanon		494 (3.3)	Italy	
Morocco		493 (6.4)	Armenia	
El Salvador		491 (4.5)	Jordan	
Botswana		489 (5.8)	Bulgaria	
Qatar		486 (3.7)	Bosnia and Herzegovina	
Ghana		486 (2.0)	Norway	
		485 (2.8)	Serbia	
		480 (3.9)	Scotland	
		477 (3.8)	Ukraine	
		474 (2.9)	Syrian Arab Republic	
		473 (4.4)	Thailand	
		469 (2.1)	Bahrain	
		468 (3.9)	Iran, Islamic Rep. of	
		462 (3.6)	Turkey	
		458 (6.5)	Malaysia	
		456 (5.0)	Israel	
		451 (4.2)	Romania	
		441 (2.0)	Tunisia	
		440 (5.1)	Georgia	
		438 (2.6)	Cyprus	
		436 (1.5)	Malta	
		434 (3.9)	Egypt	
		430 (2.5)	Kuwait	
		428 (3.5)	Oman	
		426 (3.6)	Indonesia	
		418 (4.0)	Colombia	
		417 (2.1)	Saudi Arabia	
		409 (1.9)	Algeria	
		407 (3.5)	Palestinian Nat'l Auth.	
		403 (5.9)	Lebanon	
		396 (3.1)	Morocco	
		394 (3.2)	El Salvador	
		361 (2.9)	Botswana	
		325 (1.7)	Qatar	
		316 (5.7)	Ghana	
	Benchmarking Participants			
	Massachusetts, US	545 (4.2)		
	Minnesota, US	526 (4.8)		
	British Columbia, Canada	516 (2.9)		
	Ontario, Canada	510 (3.3)		
	Quebec, Canada	495 (2.9)		
	Dubai, UAE	495 (3.3)		
	Basque Country, Spain	490 (3.0)		

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country


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

Exhibit B.12 Multiple Comparisons of Average Achievement in Applying
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.

Country	Average Scale Score	Singapore	Chinese Taipei	Japan	Hungary	Korea, Rep. of	Czech Republic	England	Slovenia	Russian Federation	Hong Kong SAR	United States	Lithuania	Australia	Sweden	Armenia	Italy	Scotland	Ukraine	Norway	Jordan	Malaysia	Thailand	Israel	Bulgaria	Romania	Serbia	Bahrain	Bosnia and Herzegovina	Malta		
Singapore	567 (4.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲		
Chinese Taipei	560 (3.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲		
Japan	555 (2.0)	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲		
Hungary	549 (3.0)	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲		
Korea, Rep. of	547 (2.0)	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲		
Czech Republic	539 (1.9)	▼	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
England	538 (4.0)	▼	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Slovenia	533 (2.2)	▼	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Russian Federation	527 (3.8)	▼	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Hong Kong SAR	522 (4.9)	▼	▼	▼	▼	▼			▼																							
United States	516 (2.7)	▼	▼	▼	▼	▼			▼																							
Lithuania	512 (2.2)	▼	▼	▼	▼	▼			▼																							
Australia	510 (3.2)	▼	▼	▼	▼	▼			▼																							
Sweden	509 (2.7)	▼	▼	▼	▼	▼			▼																							
Armenia	502 (5.4)	▼	▼	▼	▼	▼			▼																							
Italy	498 (2.9)	▼	▼	▼	▼	▼			▼																							
Scotland	495 (3.1)	▼	▼	▼	▼	▼			▼																							
Ukraine	488 (3.7)	▼	▼	▼	▼	▼			▼																							
Norway	486 (2.3)	▼	▼	▼	▼	▼			▼																							
Jordan	485 (4.1)	▼	▼	▼	▼	▼			▼																							
Malaysia	473 (5.9)	▼	▼	▼	▼	▼			▼																							
Thailand	472 (4.1)	▼	▼	▼	▼	▼			▼																							
Israel	472 (4.2)	▼	▼	▼	▼	▼			▼																							
Bulgaria	471 (6.1)	▼	▼	▼	▼	▼			▼																							
Romania	470 (3.5)	▼	▼	▼	▼	▼			▼																							
Serbia	469 (3.6)	▼	▼	▼	▼	▼			▼																							
Bahrain	468 (2.1)	▼	▼	▼	▼	▼			▼																							
Bosnia and Herzegovina	463 (2.8)	▼	▼	▼	▼	▼			▼																							
Malta	462 (1.6)	▼	▼	▼	▼	▼			▼																							
Cyprus	456 (2.0)	▼	▼	▼	▼	▼			▼																							
Iran, Islamic Rep. of	454 (3.8)	▼	▼	▼	▼	▼			▼																							
Turkey	450 (3.6)	▼	▼	▼	▼	▼			▼																							
Syrian Arab Republic	445 (3.0)	▼	▼	▼	▼	▼			▼																							
Tunisia	445 (2.3)	▼	▼	▼	▼	▼			▼																							
Indonesia	425 (3.1)	▼	▼	▼	▼	▼			▼																							
Oman	423 (3.2)	▼	▼	▼	▼	▼			▼																							
Lebanon	422 (5.8)	▼	▼	▼	▼	▼			▼																							
Georgia	422 (4.5)	▼	▼	▼	▼	▼			▼																							
Colombia	417 (3.1)	▼	▼	▼	▼	▼			▼																							
Kuwait	417 (2.9)	▼	▼	▼	▼	▼			▼																							
Palestinian Nat'l Auth.	412 (4.0)	▼	▼	▼	▼	▼			▼																							
Algeria	410 (2.4)	▼	▼	▼	▼	▼			▼																							
Egypt	404 (3.6)	▼	▼	▼	▼	▼			▼																							
Saudi Arabia	403 (2.7)	▼	▼	▼	▼	▼			▼																							
Morocco	400 (3.3)	▼	▼	▼	▼	▼			▼																							
El Salvador	388 (3.2)	▼	▼	▼	▼	▼			▼																							
Botswana	358 (3.2)	▼	▼	▼	▼	▼			▼																							
Qatar	322 (1.5)	▼	▼	▼	▼	▼			▼																							
Ghana	291 (5.5)	▼	▼	▼	▼	▼			▼																							
Benchmarking Participants																																
Massachusetts, US	550 (4.0)	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	534 (4.8)	▼	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Ontario, Canada	522 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼																						
British Columbia, Canada	521 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼																						
Quebec, Canada	500 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼																						
Basque Country, Spain	499 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼																						
Dubai, UAE	489 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼																						

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

Exhibit B.12 Multiple Comparisons of Average Achievement in Applying (Continued)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.

	Benchmarking Participants	Country	Average Scale Score																																																																																																																																																																																																	
			Massachusetts, US	Minnesota, US	Ontario, Canada	British Columbia, Canada	Quebec, Canada	Basque Country, Spain	Dubai, UAE																																																																																																																																																																																											
Cyprus	▲	Singapore	567 (4.2)	Iran, Islamic Rep. of	▲	Chinese Taipei	560 (3.4)	Turkey	▲	Japan	555 (2.0)	Syrian Arab Republic	▲	Hungary	549 (3.0)	Tunisia	▲	Korea, Rep. of	547 (2.0)	Indonesia	▲	Czech Republic	539 (1.9)	Oman	▲	England	538 (4.0)	Lebanon	▲	Slovenia	533 (2.2)	Georgia	▲	Russian Federation	527 (3.8)	Colombia	▲	Hong Kong SAR	522 (4.9)	Kuwait	▲	United States	516 (2.7)	Palestinian Nat'l Auth.	▲	Lithuania	512 (2.2)	Algeria	▲	Australia	510 (3.2)	Egypt	▲	Sweden	509 (2.7)	Saudi Arabia	▲	Armenia	502 (5.4)	Morocco	▲	Italy	498 (2.9)	El Salvador	▲	Scotland	495 (3.1)	Botswana	▲	Ukraine	488 (3.7)	Qatar	▲	Norway	486 (2.3)	Ghana	▲	Jordan	485 (4.1)		▲	Malaysia	473 (5.9)		▲	Thailand	472 (4.1)		▲	Israel	472 (4.2)		▲	Bulgaria	471 (6.1)		▲	Romania	470 (3.5)		▲	Serbia	469 (3.6)		▲	Bahrain	468 (2.1)		▲	Bosnia and Herzegovina	463 (2.8)		▲	Malta	462 (1.6)		▲	Cyprus	456 (2.0)		▲	Iran, Islamic Rep. of	454 (3.8)		▲	Turkey	450 (3.6)		▲	Syrian Arab Republic	445 (3.0)		▲	Tunisia	445 (2.3)		▼	Indonesia	425 (3.1)		▼	Oman	423 (3.2)		▼	Lebanon	422 (5.8)		▼	Georgia	422 (4.5)		▼	Colombia	417 (3.1)		▼	Kuwait	417 (2.9)		▼	Palestinian Nat'l Auth.	412 (4.0)		▼	Algeria	410 (2.4)		▼	Egypt	404 (3.6)		▼	Saudi Arabia	403 (2.7)		▼	Morocco	400 (3.3)		▼	El Salvador	388 (3.2)		▼	Botswana	358 (3.2)		▼	Qatar	322 (1.5)		▼	Ghana	291 (5.5)	
		Benchmarking Participants	Massachusetts, US	Minnesota, US	Ontario, Canada	British Columbia, Canada	Quebec, Canada	Basque Country, Spain	Dubai, UAE																																																																																																																																																																																											
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			▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	534 (4.8)																																																																																																																																																																					
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			▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	489 (3.1)																																																																																																																																																																						

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country

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

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Exhibit B.13 Multiple Comparisons of Average Achievement in Reasoning

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.

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

A plus (+) sign indicates average achievement could not be accurately estimated.



TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Exhibit B.13 Multiple Comparisons of Average Achievement in Reasoning (Continued)

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.

	Tunisia	Serbia	Bosnia and Herzegovina	Bulgaria	Syrian Arab Republic	Indonesia	Oman	Colombia	Lebanon	Algeria	Morocco	Kuwait	Palestinian Nat'l Auth.	Egypt	Saudi Arabia	Georgia	El Salvador	Botswana	Qatar	Ghana	Benchmarking Participants		Average Scale Score	Country
																					Massachusetts, US	Minnesota, US	Ontario, Canada	British Columbia, Canada
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	+ +	564 (4.1)	Singapore		
▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	+ +	560 (2.0)	Japan		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	558 (2.0)	Korea, Rep. of		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	547 (4.0)	England		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	541 (3.5)	Chinese Taipei		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	538 (2.2)	Slovenia		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	534 (2.3)	Czech Republic		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	533 (5.0)	Hong Kong SAR		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	530 (3.6)	Australia		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	530 (3.0)	Hungary		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	529 (2.9)	United States		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	527 (2.5)	Lithuania		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	520 (3.7)	Russian Federation		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	517 (2.6)	Sweden		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	511 (3.6)	Scotland		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	493 (2.6)	Italy		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	491 (2.8)	Norway		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	488 (3.9)	Ukraine		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	487 (4.9)	Malaysia		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	481 (4.2)	Israel		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	473 (1.4)	Malta		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	473 (4.0)	Thailand		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	471 (4.1)	Jordan		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	469 (2.0)	Bahrain		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	462 (3.4)	Turkey		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	462 (3.8)	Iran, Islamic Rep. of		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	460 (2.3)	Cyprus		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	460 (3.5)	Romania		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	459 (6.5)	Armenia		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	458 (2.9)	Tunisia		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	455 (3.5)	Serbia		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	452 (3.1)	Bosnia and Herzegovina		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	448 (6.1)	Bulgaria		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	440 (2.7)	Syrian Arab Republic		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	438 (3.2)	Indonesia		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	428 (3.5)	Oman		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	428 (2.7)	Colombia		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	420 (5.6)	Lebanon		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	414 (1.9)	Algeria		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	413 (3.0)	Morocco		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	411 (2.9)	Kuwait		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	396 (3.8)	Palestinian Nat'l Auth.		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	395 (3.4)	Egypt		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	395 (2.5)	Saudi Arabia		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	394 (4.6)	Georgia		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	384 (3.4)	El Salvador		
▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	+ +	362 (2.7)	Botswana		
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	564 (4.0)	Qatar		
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	483 (3.3)	Ghana		

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country


TIMSS & PIRLS
 International Study Center
 Lynch School of Education, Boston College

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

