# **Appendix C**

# The Test-Curriculum Matching Analysis: Science

To ensure that comparisons of student achievement across countries would be as fair and equitable as possible, TIMSS developed extensive assessment frameworks and specifications that addressed the important aspects of science in countries' curricula and instructional programs, and went to great lengths to develop assessment items that faithfully represented those specifications. Similar to the procedures used for developing the original TIMSS instruments, developing the TIMSS 2003 tests involved a series of reviews by representatives of the participating countries, experts in science, and testing specialists. The National Research Coordinators (NRCs) from each country formally approved the TIMSS 2003 tests, thus accepting them as being sufficiently fair to compare their students' science achievement with that of students from other countries.

Although the tests were developed to represent an agreed-upon framework and were intended to have as much in common across countries as possible, it was inevitable that the match between the TIMSS 2003 test and the science curriculum would not be the same in all countries. To restrict test items to just those topics included in the curricula of all participating countries and covered in the same

<sup>1</sup> See Appendix A for more information on test development.

sequence would severely limit test coverage and restrict the research questions that the study is designed to address. The tests, therefore, inevitably have some items measuring topics unfamiliar to some students in some countries.

The Test-Curriculum Matching Analysis (TCMA) was conducted to investigate the appropriateness of the TIMSS 2003 science test for the eighth- and fourth-grade students in the participating countries. TCMA also shows how student performance for individual countries varies when based only on the test questions that are judged to be relevant to their own curricula.<sup>2</sup>

To gather data about the extent to which the TIMSS 2003 tests were relevant to the curricula of the participating countries, each NRC reported whether each item was in that country's intended curriculum at the grade tested (eighth or fourth grade in most countries). The NRC was asked to choose a person or persons who were very familiar with the curriculum at these grades to make this determination. Since an item might be in the curriculum for some but not all students in a country, an item was to be determined appropriate if it was in the intended curriculum for more than 50 percent of the students. The NRCs had considerable flexibility in selecting items and may have considered items inappropriate for other reasons. All participants returned the information for analysis except Syria at eighth grade and Yemen at fourth grade.

Exhibits C.1 and C.2 present the TCMA results for the TIMSS 2003 tests at eighth and fourth grades. Exhibit C.1 shows the average percent correct on the science items selected as appropriate by each country. Exhibit C.2 shows the standard errors corresponding to the percentages presented in Exhibit C.1.

In Exhibit C.1, the last row of the exhibit shows the number of items (score points) identified as appropriate in each country.<sup>3</sup> At the eighth grade, the percentage of score points ranged from 100 percent (206 score points) in Israel and Saudi Arabia to 31 percent (63 score points) in Belgium (Flemish). Generally, the proportion of items judged

<sup>2</sup> Because there may also be curriculum areas covered in some countries that are not covered by the TIMSS 2003 tests, the TCMA does not provide complete information about how well the tests cover the curricula of the countries.

<sup>3</sup> Some items were assigned more score points than others. In particular, some items had two parts, and some extended-response items were scored on a two-point scale. The TCMA uses score points in order to give the same weight to items given them in test scoring.

appropriate was high, with 40 of the 50 participants indicating that items representing three-quarters or more of the score points (154 out of a possible 206) were appropriate. Only Belgium (Flemish) and Chile considered less than 50 percent of the score points appropriate. At the fourth grade, the percentage of score points ranged from 98 percent (161 score points) in Hungary, the United States, Latvia, Lithuania, Moldova, and Armenia to 27 percent (44 score points) in Japan. Eighteen of the 28 fourth-grade participants indicated that items representing three-quarters or more of the score points (124 out of a possible 165) were appropriate.

Since most countries indicated that some items were not included in their intended curriculum at the grade tested, the data were analyzed to determine whether the inclusion of these items had any effect on the international performance comparisons.<sup>4</sup>

The first column in Exhibit C.1 shows the average percent correct on all test items for each participant. Subsequent columns show the performance of each participant on those items judged appropriate by the participant listed at the head of the column. Participants are presented in order of their performance based on average percent correct on all items, from highest to lowest. To interpret this exhibit, reading across a row provides the average percent correct for the students in that country on the items selected by each of the countries listed across the top of the exhibit. For example, at the eighth-grade, Singapore, where the average percent correct was 65 percent on its own set of items, had 63 percent correct for the items selected by Chinese Taipei, 63 percent for the items selected by Estonia, 62 percent for the items selected by Korea, and so forth. The column for a country listed across the top shows how each of the other participants performed on the subset of items selected as appropriate for that country's students. Using the set of items selected by Bulgaria as an example, on average, 63 percent of these items were answered correctly by students in Singapore, 62 percent by students in Chinese Taipei, 58 percent by students in Estonia, 58 percent by those in Korea, and so forth. The shaded

<sup>4</sup> It should be noted that the science achievement presented in Exhibit C.1 is based on average percent correct, which is different from the average scale scores that are presented in Chapter 1.

#### Exhibit C.1: Average Percent Correct for Test-Curriculum Matching Analysis – Science

Based on Subset of Items Specially Identified by Each Country as Addressing its Curriculum (See Exhibit C.2 for corresponding standard errors)



Instructions: Read **across** the row to compare that country's performance based on the test items included by each of the countries across the top. Read **down** the column under a country name to compare the performance of the country down the left on the items included by the country listed on the top. Read along the **diagonal** to compare performance for each different country based on its own decisions about the test items to include.

	instructions:	acro the i	ss the	e top inclu	. Rea uded	d <b>do</b> v	<b>wn</b> th	e col ntry l	umn isted	unde on th	r a co ne top	ountry o. Rea	nam d alo	ie to ng th	comp ne <b>di</b> a	are t	he pe	erforn	nance	of t	he co	untry ice for	dow	n the	left (	
Countries	Average Percent Correct on All Items	Singapore	Chinese Taipei	Estonia	Korea, Rep. of	Hong Kong, SAR	Japan	Hungary	England	Sweden	Netherlands	United States	Australia	Slovak Republic	Lithuania	Russian Federation	Slovenia	New Zealand	Latvia	Belgium (Flemish)	Scotland	Malaysia	Italy	Israel	Norway	Jordan
Singapore	62 (0.9)	65	63	63	62	63	63	62	62	63	64	63	62	62	63	64	62	65	63	67	62	64	63	62	62	61
Chinese Taipei	61 (0.8)	63	61	61	61	61	63	61	60	61	63	62	61	60	62	62	61	63	62	65	60	62	62	61	61	59
Estonia	58 (0.6)	59	57	58	58	58	58	58	58	58	60	59	59	58	59	60	59	61	59	62	57	59	59	58	58	57
Korea, Rep. of	57 (0.4)	58	57	57	58	58	59	58	58	57	60	58	57	57	58	57	57	60	58	61	57	59	59	57	58	56
Hong Kong, SAR	57 (0.7)	58	57	57	58	58	58	57	57	57	60	58	57	56	58	58	57	59	58	64	57	58	58	57	57	56
Japan	57 (0.5)	57 57	57 56	57 56	57	57 56	61 58	57 57	57 56	57 57	59 57	58 57	57 57	57 56	58 57	59 59	56 57	59 59	58 57	59 61	56 55	57 57	58 58	57 56	57 57	55 55
Hungary	56 (0.6) 55 (0.9)	56	54	55	56 55	55	55	55	55	55	57	56	55	55	56	55	55	58	56	61	54	56	56	55	55	53
England Sweden	53 (0.9)	53	52	52	52	53	54	52	52	53	54	54	53	53	54	54	53	56	54	58	52	54	54	53	53	51
Netherlands	52 (0.8)	53	51	53	53	53	52	53	53	52	56	54	53	52	54	52	53	56	54	59	51	54	55	52	53	50
United States	52 (0.7)	52	51	52	52	52	49	52	52	52	53	52	52	52	52	52	52	55	52	58	51	53	54	52	52	50
Australia	51 (0.8)	51	50	51	51	52	49	51	52	51	54	52	52	51	52	52	52	55	52	57	50	52	53	51	52	50
Slovak Republic	51 (0.7)	51	51	51	51	51	52	51	51	52	52	52	51	52	52	54	52	54	52	56	50	52	53	51	51	50
Lithuania	51 (0.5)	52	50	52	51	51	52	51	51	52	53	52	51	51	52	52	51	54	52	56	50	52	52	51	51	50
Russian Federation	50 (0.7)	51	50	51	50	50	51	51	50	51	52	51	51	51	51	55	51	53	51	55	49	52	52	50	51	49
Slovenia	50 (0.4)	50	49	50	49	49	51	50	49	50	51	51	51	50	51	51	51	52	51	55	49	51	51	50	50	48
New Zealand	50 (1.1)	50	49	50	50	50	48	50	50	49	51	51	50	49	51	49	50	53	51	54	49	51	51	50	50	48
Latvia	49 (0.6)	49	48	49	49	49	49	49	49 49	49 49	51 52	50	49	49	50	50 48	50 49	52 51	50 50	53 56	47 47	50 49	50 51	49 49	49	47 47
Belgium (Flemish)	49 (0.5)	49	48	48	49	49	48	49	49	49	51	50	49	49	50	48	49	51	50	54	47	49	50	49	49	47
Scotland Malaysia	49 (0.8)	49	48	48	48	48	49	47	48	48	50	49	48	48	49	49	48	51	49	53	47	50	49	48	48	47
Italy	46 (0.6)	46	45	46	46	46	45	46	46	46	47	46	46	46	46	47	46	48	46	54	45	47	47	46	46	44
Israel	45 (0.6)	46	45	46	45	45	47	45	45	46	46	46	46	46	46	47	46	48	46	51	45	47	47	45	46	44
Norway	45 (0.5)	44	44	45	45	46	44	45	45	45	46	46	46	45	46	46	46	48	46	49	44	46	47	45	45	43
Jordan	42 (0.7)	42	42	43	42	42	44	42	42	42	43	43	42	42	43	44	42	44	43	46	42	43	43	42	42	43
Bulgaria	42 (1.0)	42	41	42	41	41	44	42	42	42	43	42	42	42	42	44	42	44	42	47	41	42	43	42	42	41
Romania	41 (0.9)	41	40	41	40	40	42	41	40	41	43	41	41	41	41	43	41	43	41	45	40	42	42	41	41	40
Serbia	40 (0.5)	40	39	40	39	39	41	39	39	40	40	40	40	40	40	42	40	42	40	45	39	41	41	40	40	39
Moldova, Rep. of	40 (0.7)	40	39	40	39	39	42	40	40	41	41	40	40	40	40	42	40	41	40	44	39	41	41	40	40	39
Armenia	38 (0.7)	39	38 37	38	37	37 37	40 38	38	38	39 37	40 39	39	38	38	39 39	40	38	40	39	41	37	39	40 39	38	38	38 37
Iran, Islamic Rep. of Macedonia, Rep. of	38 (0.5) 37 (0.7)	38	37	37	37	36	40	37	37	38	38	37	38	37	37	39	38	39	37	42	36	38	38	37	37	36
Bahrain	36 (0.3)	37	36	36	36	36	40	36	36	37	38	37	36	36	37	37	35	38	37	41	36	37	38	36	37	36
Palestinian Nat'l Auth.	35 (0.6)	36	35	36	35	35	38	35	35	35	36	36	36	35	36	37	35	37	36	38	35	37	36	35	35	36
Cyprus	35 (0.3)	36	34	35	35	34	37	35	35	35	36	36	35	35	36	36	35	37	36	40	34	36	36	35	35	33
Chile	34 (0.5)	34	33	34	33	33	32	33	33	34	34	34	33	34	34	35	34	35	34	39	33	35	35	34	34	32
Egypt	33 (0.6)	34	33	33	33	33	35	33	33	33	34	34	33	33	34	34	33	34	34	36	33	34	34	33	33	33
Indonesia	32 (0.5)	33	31	32	32	32	32	31	32	32	34	32	32	32	32	33	32	34	32	38	31	33	33	32	32	31
Lebanon	29 (0.6)	31	29	29	29	28	33	29	29	30	29	30	30	29	30	31	30	30	30	33	29	31	30	29	29	29
Tunisia	29 (0.3)	30	30	29	29	29	32	29	29	30	31	30	30	29	30	31	30	31	30	35	29	31	30	29	29	28
Morocco	28 (0.3)	30	28	28	28	27	32	28	28	29	29	29	29	29	29	29	28	30	29	33	27	29	29	28	29	27
Saudi Arabia	28 (0.6)	29	28 27	29 28	28 28	28 27	31	28 27	28 28	29 28	29	29	29 28	28	29 28	29	28	30 29	29 28	33 34	28 27	29	30 29	28 28	28	28 27
Philippines Botswana	28 (0.8) 26 (0.4)	27	25	25	26	25	27	25	25	25	26	26	26	26	26	26	26	26	26	30	25	26	27	26	26	25
South Africa	19 (0.7)	20	18	19	19	18	20	19	19	19	18	19	19	19	19	20	19	19	19	21	19	20	19	19	19	19
Ghana	19 (0.7)	19	18	19	18	17	20	18	18	19	17	18	19	19	18	20	19	18	18	21	18	19	19	19	19	18
International Avg.	43 (0.1)	44	43	43	43	43	44	43	43	43	45	44	43	43	44	44	43	45	44	48	42	44	44	43	43	42
nchmarking Participants	. ,																									
Basque Country, Spain	44 (0.7)	44	43	44	44	44	44	44	44	44	46	45	44	44	45	45	44	47	45	51	43	45	46	44	44	42
Indiana State, US	52 (1.1)	52	51	52	52	52	49	52	52	52	54	53	52	52	53	52	52	55	53	59	51	53	54	52	52	50
Ontario Province, Can.	53 (0.7)	53	52	53	54	54	50	53	53	53	56	54	53	53	54	53	54	57	54	60	52	54	55	53	54	52
Quebec Province, Can.	53 (0.7)	53	52	53	53	54	52	53	53	53	55	54	53	53	54	54	54	57	54	59	52	55	55	53	54	51
Number of Items																										
(Score Points) Identified*	206	176	164	184	194	177	104	198	199	192	145	195	179	190	195	129	176	167	195	63	180	189	188	206	202	181

Of the 189 items in the Science test, some extended-response items were scored on a two-point scale, resulting in 211 total score points. Following item review, response categories were combined for a number of items, resulting in 206 total score points.

<sup>()</sup> Standard errors appear in parentheses.

# Exhibit C.1: Average Percent Correct for Test-Curriculum Matching Analysis – Science

Based on Subset of Items Specially Identified by Each Country as Addressing its Curriculum (See Exhibit C.2 for corresponding standard errors)



Instructions: Read **across** the row to compare that country's performance based on the test items included by each of the countries across the top. Read **down** the column under a country name to compare the performance of the country down the left on the items included by the country listed on the top. Read along the **diagonal** to compare performance for each different country based on its own decisions about the test items to include.

Bulgaria	Romania	Serbia	Moldova, Rep. of	Armenia	Iran, Islamic Rep. of	Macedonia, Rep. of	Bahrain	Palestinian Nat'l Auth.	Cyprus	Chile	Egypt	Indonesia	Lebanon	Tunisia	Morocco	Saudi Arabia	Philippines	Botswana	South Africa	Ghana	Basque Country Spain	of the second second	Indiana State, US	Ontario Province, Can.	Quebec Province, Can.	Average Percent Correct on All Items	Countries
63	64	63	63	63	64	63	63	65	63	65	63	63	64	62	63	62	62	64	65	64	6	3 (	62	62	61	62 (0.9)	Singapore
62	62	61	62	62	62	61	61	62	61	64	61	62	63	60	62	61	60	61	63	61	6	1 (	60	61	60	61 (0.8)	Chinese Taipei
58	60	58	59	59	59	59	58	59	58	62	58	59	59	58	58	58	58	57	60	60	5	8 !	58	59	59	58 (0.6)	Estonia
58	59	58	58	58	59	58	58	59	58	59	58	58	59	57	58	57	56	58	58	59	5	8 !	58	59	58	57 (0.4)	Korea, Rep. of
57	58	57	58	58	58	57	58	59	57	60	58	58	59	57	56	57	57	58	60	58	5	7 !	57	58	57	57 (0.7)	Hong Kong, SAR
57	58	57	58	58	58	58	57	58	57	59	58	58	59	57	58	57	56	58	57	57	5	7 !	57	57	56	57 (0.5)	Japan
57	59	57	57	57	58	57	56	58	56	60	57	57	58	56	57	56	56	55	58	58	5	6 !	56	57	56	56 (0.6)	Hungary
55	57	55	56	56	56	55	55	56	54	57	56	56	56	55	54	55	54	55	56	57	5	5 !	55	56	54	55 (0.9)	England
53	55	53	54	54	54	54	53	54	52	56	53	54	55	52	52	53	52	52	53	54	5	3 !	53	54	53	53 (0.7)	Sweden
53	55	53	54	54	53	53	53	53	51	55	53	54	54	53	52	52	52	53	54	54	5	3 !	53	54	53	52 (0.8)	Netherlands
52	53	52	52	52	52	52	52	52	50	54	52	52	52	51	50	52	52	51	53	53	5	2 !	52	53	52	52 (0.7)	United States
51	53	52	52	52	52	51	52	52	50	54	52	52	52	52	50	51	52	52	52	53	5	2 !	51	53	52	51 (0.8)	Australia
52	54	52	52	52	53	52	51	52	51	55	52	52	53	51	51	51	51	49	54	52	5	1 !	51	52	51	51 (0.7)	Slovak Republic
52	52	51	52	52	52	52	51	53	50	55	51	52	52	50	51	51	51	50	53	52	5	1 !	51	51	51	51 (0.5)	Lithuania
50	53	51	51	51	51	51	50	52	50	55	51	51	52	50	51	50	51	49	54	52	5	1 !	50	51	51	50 (0.7)	Russian Federation
50	51	50	51	51	50	50	50	51	49	53	50	51	51	49	49	50	50	49	52	52	5	0 !	50	50	50	50 (0.4)	Slovenia
50	52	50	51	51	50	50	51	51	49	52	50	51	50	50	48	50	49	49	50	52	5	0 !	50	51	50	50 (1.1)	New Zealand
49	51	49	50	50	50	49	49	49	49	53	49	50	51	49	48	49	49	48	51	51	4	9 4	49	50	49	49 (0.6)	Latvia
49	51	49	50	50	49	49	49	49	48	52	49	50	50	50	47	49	49	50	50	50	4	9 4	49	50	50	49 (0.5)	Belgium (Flemish)
49	50	49	50	50	49	49	49	50	48	50	49	50	50	49	48	49	48	48	49	50	4	9 4	48	50	49	49 (0.8)	Scotland
48	51	48	49	49	49	48	49	50	48	52	49	49	50	48	49	48	47	49	50	48	4	8 4	47	49	48	48 (0.8)	Malaysia
46	48	46	46	46	47	46	46	47	44	49	46	46	46	45	45	46	46	46	48	48	4	6 4	46	47	46	46 (0.6)	Italy
46	48	46	46	46	47	46	46	47	45	49	46	46	47	45	46	45	45	45	48	48	4	6 4	45	46	45	45 (0.6)	Israel
45	47	45	46	46	45	45	45	45	44	48	45	46	46	45	43	45	45	44	45	47	4	5 4	45	46	46	45 (0.5)	Norway
42	44	42	43	43	44	42	43	44	41	44	43	43	43	41	42	42	42	43	46	44	4	2 4	42	43	41	42 (0.7)	Jordan
42	44	42	42	42	43	43	42	43	42	45	42	42	44	41	42	42	41	40	45	43	4	2 4	42	42	41	42 (1.0)	Bulgaria
41	43	41	41	41	42	41	41	42	40	44	41	41	42	40	41	41	40	40	44	42	4	1 4	41	41	40	41 (0.9)	Romania
41	42	40	40	40	41	41	40	42	39	44	41	40	41	39	41	40	39	39	43	41	4	0 4	40	40	39	40 (0.5)	Serbia
40	42	40	40	40	41	41	40	42	40	44	40	40	42	39	41	40	39	39	43	41	4	0 3	39	40	39	40 (0.7)	Moldova, Rep. of
40	41	38	39	39	40	39	39	41	39	42	38	39	39	36	40	38	37	36	42	39	3	8	38	38	37	38 (0.7)	Armenia
39	40	38	39	39	40	38	38	40	37	42	38	39	40	37	39	38	37	36	41	40	3	8	38	39	37	38 (0.5)	Iran, Islamic Rep. of
38	39	37	37	37	39	38	38	39	37	41	38	37	39	36	39	37	37	36	40	39	3	7 :	37	37	36	37 (0.7)	Macedonia, Rep. of
37	39	37	37	37	38	37	38	39	36	39	37	37	38	36	38	36	35	36	41	39	3	7	36	37	35	36 (0.3)	Bahrain
36	37	35	36	36	37	36	37	38	35	38	36	36	37	34	36	35	34	35	39	37	3	6	35	35	35	35 (0.6)	Palestinian Nat'l Auth.
35	37	35	36	36	36	35	35	36	35	38	35	36	37	34	35	35	35	34	38	37	3	5	35	35	34	35 (0.3)	Cyprus
34	36	34	34	34	35	34	34	34	33	38	34	34	34	33	33	34	34	33	36	36	3	4	34	34	33	34 (0.5)	Chile
34	35	33	34	34	35	34	34	35	33	37	34	34	34	32	34	33	32	33	36	35	3	3	33	33	32	33 (0.6)	Egypt
32	34	32	32	32	33	31	32	33	31	33	32	32	33	32	32	32	31	34	35	33	3	2	32	32	32	32 (0.5)	Indonesia
31	31	30	30	30	31	30	30	33	30	34	30	30	32	28	32	29	29	29	33	31	3	0 2	29	29	28	29 (0.6)	Lebanon
30	31	29	30	30	31	29	31	31	29	32	30	30	31	29	29	29	29	30	34	31	3	0 2	29	30	29	29 (0.3)	Tunisia
29	30	28	29	29	29	29	28	30	29	31	29	29	31	28	31	28	28	29	32	30	2	9   2	28	29	28	28 (0.3)	Morocco
29	31	28	29	29	29	29	29	31	28	31	29	29	30	27	29	28	27	28	32	30	2	8 2	28	29	27	28 (0.6)	Saudi Arabia
28	29	28	28	28	29	28	28	29	27	31	28	28	29	27	28	28	27	27	31	29	2	8 2	28	28	27	28 (0.8)	Philippines
26	27	26	26	26	26	26	26	27	26	28	26	26	27	25	27	26	25	27	29	27	2	6	26	26	25	26 (0.4)	Botswana
19	20	19	19	19	19	19	19	20	19	22	19	19	20	18	20	19	18	18	22	20	1	9	19	19	18	19 (0.7)	South Africa
19	20	18	18	18	19	19	19	20	19	22	19	18	20	17	20	19	18	18	21	20	1	9	18	18	17	19 (0.4)	Ghana
44	45	43	44	44	44	44	44	45	43	46	44	44	45	43	43	43	43	43	46	45	4	3 4	43	44	43	43 (0.1)	International Avg.
																											Benchmarking Participants
45	46	45	45	45	45	44	44	45	43	47	45	45	45	44	43	44	44	44	46	46	4	4	44	45	44	44 (0.7)	Basque Country, Spain
52	54	52	53	53	53	52	52	52	50	55	53	53	52	52	50	52	52	51	53	54	5	2 !	52	53	52	52 (1.1)	Indiana State, US
53	-	54	54	54	54	53	54	54	52	55	54	54	54	53	51	53	53	53	53	55	5	_	53	55	54	53 (0.7)	Ontario Province, Can.
53	-	54	54	54	54	53	53	54	52	55	53	54	54	54	51	53	53	53	54	55	5	3 !	53	55	54	53 (0.7)	Quebec Province, Can.
166	166	201	195	195	175	179	162	160	160	95	195	195	148	174	128	206	174	130	106	143	20	)4 1	96	186	159	206	Number of Items (Score Points) Identified*

Of the 189 items in the Science test, some extended-response items were scored on a two-point scale, resulting in 211 total score points. Following item review, response categories were combined for a number of items, resulting in 206 total score points.

<sup>()</sup> Standard errors appear in parentheses.

## Exhibit C.1: Average Percent Correct for Test-Curriculum Matching Analysis – Science

Based on Subset of Items Specially Identified by Each Country as Addressing its Curriculum (See Exhibit C.2 for corresponding standard errors)



	Instructions:	Rea liste	d <b>do</b>	<b>wn</b> th	ne co op. R	lumn	unde	r a co	ountr	y nan	ne to	comp	are t	he pe	rforn	nance	of th	e cou	intry	dowr	ı the l	left or	the	items	s incl	uded	ss the to by the co out the	ountr	ce, Can. Science Study (TIMSS) 2003
Countries	Average Percent Correct on All Items	Singapore	Chinese Taipei	Japan	Hungary	England	United States	Latvia	Hong Kong, SAR	Russian Federation	Australia	Netherlands	New Zealand	Italy	Belgium (Flemish)	Lithuania	Scotland	Slovenia	Moldova, Rep. of	Cyprus	Norway	Iran, Islamic Rep. of	Armenia	Philippines	Tunisia	Morocco	Indiana State, US	Ontario Province, Can.	P 9 9 Quebec Province, Can. In International Mathematics and Science Stud
Singapore	67 (1.1)	70	73	69	68	69	67	67	69	70	68	70	69	71	69	67	70	68	67	69	68	71	67	67	70	70	70	69	
Chinese Taipei	66 (0.3)	66	72	64	66	65	65	65	66	70	67	67	66	69	66	65	69	67	65	66	67	68	65	66	68	67	70	66	65 <u>E</u>
Japan	65 (0.3)	67	71	69	66	65	65	65	67	68	66	68	66	68	67	65	67	66	65	67	66	68	65	64	67	67	71	67	64
Hungary	64 (0.6)	65	67	60	65	64	64	64	64	70	65	66	65	69	66	64	68	65	64	65	66	67	64	63	66	67	67	66	64 =
England	63 (0.7)	64	69	64	64	64	63	63	64	68	65	66	65	67	64	63	67	65	63	64	65	66	63	64	65	64	69	65	63 Face 63 E9
United States	63 (0.5)	64	67	61	64	64	63	63	64	68	64	65	64	67	64	63	66	64	63	64	65	66	63	62	65	65	69	65	63 0
Latvia	63 (0.5)	63	66	60	63	63	62	62	64	68	64	65	63	67	64	62	65	64	62	63	65	65	62	62	65	64	67	64	62 S
Hong Kong, SAR	62 (0.7)	63	68	61	62	62	62	62	63	65	63	64	63	66	63	62	65	63	62	62	63	65	62	62	64	63	65	63	61 "
Russian Federation	61 (0.9)	62	65	59	62	61	61	61	62	67	62	63	63	66	63	61	65	63	61	62	63	64	61	61	65	63	66	63	60 SOURCE:
Australia	61 (0.8)	61	65	59	61	61	61	61	61	66	62	63	62	65	62	61	64	61	61	61	62	63	61	60	63	63	67	62	
Netherlands	60 (0.5)	61	63	53	61	60	60	60	61	65	61	63	60	65	63	60	62	61	60	61	62	62	60	57	62	62	64	62	60
New Zealand	59 (0.5)	60	63	58	60	60	59	59	60	64	61	61	60	64	61	59	63	60	59	60	61	62	59	58	62	61	65	61	59
Italy	59 (0.7)	61	63	58	60	59	59	59	61	64	60	62	61	65	61	59	63	60	59	61	61	63	59	58	62	62	64	61	59
Belgium (Flemish)	59 (0.4)	60	63	56	60	60	59	59	60	64	60	62	59	64	62	59	62	60	59	60	62	62	59	57	61	61	65	61	59
Lithuania	59 (0.5)	60	63	56	60	59	59	59	60	64	60	61	60	63	61	59	62	61	59	60	61	62	59	59	61	61	64	61	59
Scotland	56 (0.6)	57	61	54	57	57	56	56	57	61	58	59	57	61	58	56	60	57	56	57	58	59	56	55	58	57	62	58	56
Slovenia	54 (0.5)	55	59	54	55	55	54	54	55	59	55	58	55	59	57	54	57	56	54	55	56	57	54	54	56	56	60	56	54
Moldova, Rep. of	53 (0.8)	53	57	49	53	53	53	53	53	58	53	55	54	57	54	53	56	54	53	53	54	56	53	53	56	55	58	55	53
Cyprus	53 (0.4)	54	59	49	53	53	52	52	54	56	53	55	53	57	54	52	56	54	52	54	54	57	52	53	56	54	56	55	53
Norway	52 (0.4)	52	55	47	52	51	51	51	53	56	52	53	53	56	53	51	55	53	51	50	54	54	51	50	53	53	55	53	51
Iran, Islamic Rep. of	41 (0.7)	42	47	39	42	42	41	41	42	45	42	43	43	45	42	41	45	43	41	42	42	45	41	42	44	43	45	43	41
Armenia	41 (0.7)	42	44	34	41	41	41	41	42	45	42	43	42	45	42	41	45	43	41	41	43	45	41	42	44	43	45	43	41
Philippines	31 (1.3)	31	35	29	31	32	31	31	31	32	31	32	32	34	30	31	34	32	31	31	32	34	31	34	32	33	34	32	30
Tunisia	27 (0.6)	28	33	27	28	28	27	27	28	30	28	28	29	30	28	27	30	29	27	28	28	30	27	26	30	29	30	29	27
Morocco	27 (0.6)	27	31	22	27	27	26	26	27	28	27	27	27	29	26	26	29	27	26	27	28	30	26	27	30	29	30	28	26
International Avg.	55 (0.1)	55	59	52	55	55	55	55	56	59	56	57	56	59	56	55	58	56	55	55	56	58	55	54	57	56	59	56	54
Benchmarking Participants																													
Indiana State, US	66 (0.8)	67	70	65	67	67	66	66	67	71	68	68	67	70	67	66	69	67	66	67	68	68	66	65	68	68	72	68	66
Ontario Province, Can.	65 (0.7)	66	69	63	66	66	65	65	66	69	66	67	66	69	66	65	68	65	65	66	66	67	65	63	67	66	71	67	64
Quebec Province, Can.	58 (0.5)	58	61	54	58	58	57	57	58	63	59	60	58	62	59	57	61	59	57	58	59	60	57	55	60	59	63	59	58
						_					_										_								
Number of Items (Score Points) Identified*	165	130	69	44	161	134	161	161	140	108	155	115	136	134	126	161	122	136	161	130	150	123	161	66	89	100	68	149	148

Of the 152 items in the Science test, some extended-response items were scored on a two-point scale, resulting in 168 total score points. Following item review, some items were deleted and response categories were combined for a number of items, resulting in 150 items and 165 total score points.

<sup>()</sup> Standard errors appear in parentheses.

diagonal element in the exhibit shows how each country performed on the subset of items that it selected based on its own curriculum. Thus, Bulgarian students averaged 42 percent correct on the set of items identified by Bulgaria for the analysis.

The international averages on each country's selected items are presented in the lower part of the exhibit. They show that the selection of items for the participating countries varied somewhat in average difficulty, ranging from 42 percent for those chosen by Scotland and Jordan at the eighth grade to 48 percent for those chosen by Belgium (Flemish). Similarly at the fourth grade, the average percent correct ranged from 52 percent for those items chosen by Japan to 59 percent for those chosen by Chinese Taipei, Italy, Russian Federation, and Indiana State. Despite these differences in the difficulty of the selected items, the overall message of Exhibit C.1 is that different item selections do not make a major difference in how well countries perform relative to one another. The items selected by some countries were more difficult than those selected by others. The relative performance of countries on various item selections did vary somewhat, but generally not in a statistically significant manner.<sup>5</sup>

Comparing the diagonal element for a country with the overall average percent correct shows the difference between performance on the subset of items chosen as appropriate and performance on the test as a whole. In general, there were only small increases in each country's performance on its own subset of items. To illustrate, the average percent correct for Singapore across all eighth-grade science items was 62 percent. The diagonal element shows that Singaporean students had a slightly greater average percent correct (65 percent) across the set of items selected as appropriate for Singapore than they did overall. Almost all participants had a difference of one or two percentage points between the two performance measures, with the largest difference – seven percent – for Belgium (Flemish) (49 percent compared with 56 percent).

<sup>5</sup> Small differences in performance shown in this exhibit are not statistically significant. The standard errors for the estimated average percent correct statistics are in Exhibit C.2. It can be said with 95 percent confidence that the value for the entire population falls between the sample estimate plus or minus two standard errors.

#### Exhibit C.2: Standard Errors for the Test-Curriculum Matching Analysis - Science



	Instructions:	acros the i	ss the tems	top.	Read ded I	d <b>dov</b> by the	<b>vn</b> th e cou	e col ntry l	umn isted	unde on th	r a co ne top	erforn ountry o. Rea items	nam d alo	ie to ng th	comp ne <b>di</b> a	are t	ne pe	rform	nance	of the	ne co	untry	dow	n the	left o	uc v (TIMSS) 2003
Countries	Average Percent Correct on All Items	Singapore	Chinese Taipei	Estonia	Korea, Rep. of	Hong Kong, SAR	Japan	Hungary	England	Sweden	Netherlands	United States	Australia	Slovak Republic	Lithuania	Russian Federation	Slovenia	New Zealand	Latvia	Belgium (Flemish)	Scotland	Malaysia	Italy	Israel	Norway	90 80 60 Jordan in International Mathematics and Science Study (TIMSS) 2003
Singapore	62 (0.9)	1.0	1.0	1.0	0.9	1.0	1.0	0.9	0.9	0.9	0.9	1.0	0.9	0.9	1.0	1.0	1.0	0.9	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
Chinese Taipei	61 (0.8)	8.0	0.8	8.0	8.0	0.8	8.0	0.8	8.0	0.8	0.8	0.8	0.8	8.0	0.8	8.0	0.8	8.0	0.8	0.8	8.0	0.8	0.8	0.8	8.0	<u>a</u> 8.0
Estonia	58 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	<u>ة</u> 6.0
Korea, Rep. of	57 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Hong Kong, SAR	57 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7 0.5
Japan	57 (0.5)	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.4	0.5	0.5	
Hungary	56 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6
England	55 (0.9)	0.9	1.0	1.0	0.9	1.0	0.9	1.0	1.0	0.9	1.0	1.0	1.0	0.9	1.0	1.0	0.9	1.0	1.0	1.0	1.0	0.9	1.0	0.9	1.0	0.9
Sweden	53 (0.7)	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6 9.0 9.0 9.0 9.0 9.0 9.0 9.0
Netherlands	52 (0.8)	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
United States	52 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Australia	51 (0.8)	0.9	0.8	0.8	0.8	0.9	0.9	0.9	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8
Slovak Republic	51 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7
Lithuania	51 (0.5)	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5
Russian Federation	50 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Slovenia	50 (0.4)	1.1		_	1.1	1.2	1.1	1.2	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.2	1.1	1.2	1.1	1.2	1.1	1.1	1.1	1.1		1.1
New Zealand	50 (1.1)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Latvia	49 (0.6)	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5
Belgium (Flemish)	49 (0.5)	0.3	0.8	0.3	0.8	0.8	0.3	0.3	0.3	0.3	0.8	0.3	0.3	0.7	0.8	0.8	0.3	0.3	0.8	0.8	0.8	0.3	0.8	0.3	0.8	0.3
Scotland Malaysia	49 (0.8)	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8
Italy	46 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6
Israel	45 (0.6)	0.6	0.7	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6
Norway	45 (0.5)	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.5
Jordan	42 (0.7)	0.7	0.8	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7
Bulgaria	42 (1.0)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.1	1.0	1.1	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0
Romania	41 (0.9)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9
Serbia	40 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5
Moldova, Rep. of	40 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7
Armenia	38 (0.7)	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	8.0	0.7	0.7	0.7	0.9	0.7	0.7	0.7	0.7	0.7	0.7
Iran, Islamic Rep. of	38 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Macedonia, Rep. of	37 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Bahrain	36 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Palestinian Nat'l Auth.	35 (0.6)	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Cyprus	35 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Chile	34 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Egypt	33 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6
Indonesia	32 (0.5)	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.7	0.5	0.6	0.6	0.5	0.5	0.5
Lebanon	29 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.8	0.6	0.6	0.6	0.6	0.6	0.6
Tunisia	29 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Morocco	28 (0.3)	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3
Saudi Arabia	28 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.8	0.6	0.6	0.6	0.6	0.6	0.6
Philippines	28 (0.8)	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.0	0.8	0.8	0.8	0.8	0.8	0.8
Botswana	26 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
South Africa	19 (0.7) 19 (0.4)	0.7	0.7	0.7	0.7	_	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.7	0.8	0.7	0.7	0.8	0.7	0.7	
Ghana International Avg.	43 (0.1)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4
	43 (U.1)	0.1	J.1	J. 1	J.1	J. 1	3.1	J.1	J.1	J. I	J. I	0.1	J.1	J.1	J.1	V.1	J. 1	J.1	J. I	J.1	J.1	0.1	J. 1	J. 1	0.1	
Basque Country, Spain	44 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7
Indiana State, US		1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.2	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1
	52 (1.1)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Ontario Province, Can.  Quebec Province, Can.	53 (0.7) 53 (0.7)	0.7	0.7	0.7	0.7		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7		0.7	
Quebec Frovilice, Call.	33 (0.7)	0.7	5.7	J.1	5.1	5.7	5.0	5.1	5.1	5.7	3.7	3.1	5.1	5.1	5.7	0.0	5.1	5.1	5.1	5.0	5.7	3.1	5.1	5.7	0.7	
Number of Items (Score Points) Identified*	206	176	164	184	194	177	104	198	199	192	145	195	179	190	195	129	176	167	195	63	180	189	188	206	202	181

Of the 189 items in the Science test, some extended-response items were scored on a two-point scale, resulting in 211 total score points. Following item review, response categories were combined for a number of items, resulting in 206 total score points.

<sup>()</sup> Standard errors for the average percent of correct responses on all items appear in parentheses. The matrix contains standard errors corresponding to the average percent correct responses based on TCMA subset of items, as displayed in Table C.1.

## Exhibit C.2: Standard Errors for the Test-Curriculum Matching Analysis – Science

SCIENCE O

Instructions

Read **across** the row to compare that country's performance based on the test items included by each of the countries across the top. Read **down** the column under a country name to compare the performance of the country down the left on the items included by the country listed on the top. Read along the **diagonal** to compare performance for each different country based on its own decisions about the test items to include.

Bulgaria	Romania	Serbia	Moldova, Rep. of	Armenia	Iran, Islamic Rep. of	Macedonia, Rep. of	Bahrain	Palestinian Nat'l Auth.	Cyprus	Chile	Egypt	Indonesia	Lebanon	Tunisia	Morocco	Saudi Arabia	Philippines	Botswana	South Africa	Ghana		Basque Country, Spain	Indiana State, US	Ontario Province, Can.	Quebec Province, Can.	Average Percent Correct on All Items	Countries
1.0	0.9	0.9	1.0	1.0	1.0	0.9	1.0	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	1.0	1.0	0.9	1.0	(	0.9	0.9	0.9	1.0	62 (0.9)	Singapore
0.8	8.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	(	0.8	0.8	0.8	0.8	61 (0.8)	Chinese Taipei
0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.5	(	0.6	0.6	0.6	0.6	58 (0.6)	Estonia
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	(	0.4	0.4	0.4	0.4	57 (0.4)	Korea, Rep. of
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	(	0.7	0.7	0.7	0.7	57 (0.7)	Hong Kong, SAR
0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.4	(	0.5	0.5	0.5	0.5	57 (0.5)	Japan
0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	(	0.6	0.6	0.6	0.6	56 (0.6)	Hungary
1.0	0.9	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	0.9	0.9	1.0	0.9	1.0	0.9	0.9	1.0	1.0	0.9	0.9	(	0.9	1.0	1.0	1.0	55 (0.9)	England
0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.7	0.7	0.6	0.7	0.6	0.7	0.7	0.7	0.6	0.6		0.7	0.7	0.7	0.7	53 (0.7)	Sweden
0.8	8.0	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.8	0.7	0.8	0.8	0.7	0.8	0.7	0.8	0.8	0.8	0.7	0.8		0.8	0.8	0.8	8.0	52 (0.8)	Netherlands
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7		0.7	0.7	0.7	0.7	52 (0.7)	United States
0.8	8.0	0.8	0.8	8.0	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.9	0.9	0.8	0.8		0.8	0.8	0.9	0.9	51 (0.8)	Australia
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7		0.7	0.7	0.7	0.7	51 (0.7)	Slovak Republic
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5		0.5	0.5	0.5	0.5	51 (0.5)	Lithuania
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.6	0.7	0.7		0.7	0.7	0.7	0.7	50 (0.7)	Russian Federation
0.5	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.4		0.4	0.4	0.5	0.5	50 (0.4)	Slovenia
1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.2	1.2	1.1	1.1		1.1	1.1	1.2	1.2	50 (1.1)	New Zealand
	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6		0.6	0.6	0.6	0.6	49 (0.6)	Latvia
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5		0.5	0.5	0.5	0.6	49 (0.5)	Belgium (Flemish)
_	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.7	0.8	0.8	0.8	0.7	0.7		0.8	0.8	0.8	0.8	49 (0.8)	Scotland
0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8		0.8	0.8	0.8	0.8	48 (0.8)	Malaysia
0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6		0.6	0.6	0.6	0.6	46 (0.6)	Italy
0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6		0.6	0.6	0.6	0.7	45 (0.6)	Israel
0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.6	0.6	0.5	0.5		0.5	0.6	0.6	0.6	45 (0.5)	Norway
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1		1.0	1.0	1.0	1.0	42 (0.7)	Jordan
0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9		0.9	0.9	0.9	0.9	42 (1.0) 41 (0.9)	Bulgaria Romania
_	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5	0.5	40 (0.5)	Serbia
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7		0.7	0.7	0.7	0.7	40 (0.3)	Moldova, Rep. of
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.7		0.7	0.7	0.7	0.7	38 (0.7)	Armenia
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5	0.5	38 (0.5)	Iran, Islamic Rep. of
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7		0.7	0.7	0.6	0.7	37 (0.7)	Macedonia, Rep. of
_	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3		0.3	0.3	0.3	0.3	36 (0.3)	Bahrain
0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6		0.6	0.6	0.6	0.6	35 (0.6)	Palestinian Nat'l Auth.
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3		0.3	0.3	0.3	0.3	35 (0.3)	Cyprus
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5	0.5	34 (0.5)	Chile
0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6		0.6	0.6	0.6	0.6	33 (0.6)	Egypt
0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.6	(	0.5	0.5	0.6	0.6	32 (0.5)	Indonesia
0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	(	0.6	0.6	0.6	0.6	29 (0.6)	Lebanon
_	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3		$\rightarrow$	0.3	0.3	0.3	29 (0.3)	Tunisia
0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.4	0.4	(	0.3	0.3	0.3	0.3	28 (0.3)	Morocco
0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	(	0.6	0.6	0.6	0.5	28 (0.6)	Saudi Arabia
0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.8	0.8	0.8	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.8	(	0.8	0.8	0.8	0.8	28 (0.8)	Philippines
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	(	0.4	0.4	0.4	0.4	26 (0.4)	Botswana
0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.8	0.8	0.7	(	0.7	0.7	0.8	0.8	19 (0.7)	South Africa
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	(	0.4	0.4	0.4	0.4	19 (0.4)	Ghana
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	(	0.1	0.1	0.1	0.1	43 (0.1)	International Avg.
																											Benchmarking Participants
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	(	0.7	0.6	0.7	0.7	44 (0.7)	Basque Country, Spain
1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.1	1	1.1	1.1	1.1	1.2	52 (1.1)	Indiana State, US
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	(	0.7	0.7	0.7	0.7	53 (0.7)	Ontario Province, Can.
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.6	0.7	0.7	0.8	0.7	0.7	(	0.7	0.7	0.7	0.8	53 (0.7)	Quebec Province, Can.
																					_						
166	166	201	195	195	175	179	162	160	160	95	195	195	148	174	128	206	174	130	106	143	2	204	196	186	159	206	Number of Items (Score Points) Identified*

<sup>\*</sup> Of the 189 items in the Science test, some extended-response items were scored on a two-point scale, resulting in 211 total score points. Following item review, response categories were combined for a number of items, resulting in 206 total score points.

Standard errors for the average percent of correct responses on all items appear in parentheses. The matrix contains standard errors corresponding to the average percent correct responses based on TCMA subset of items, as displayed in Table C.1.

#### Exhibit C.2: Standard Errors for the Test-Curriculum Matching Analysis - Science



	Instructions:	Rea liste	d do	<b>wn</b> t the t	he co op. R	lumn	unde	r a co	untr	y nan	ne to	comp	are th	ne pe	rform	nance	of th	e cou	ntry	dowr	ı the l	eft or	1 the	items	s incl	uded l	s the to by the co out the t	ountr	ce, Can. Science Study (TIMSS) 2003
Countries	Average Percent Correct on All Items	Singapore	Chinese Taipei	Japan	Hungary	England	United States	Latvia	Hong Kong, SAR	Russian Federation	Australia	Netherlands	New Zealand	Italy	Belgium (Flemish)	Lithuania	Scotland	Slovenia	Moldova, Rep. of	Cyprus	Norway	Iran, Islamic Rep. of	Armenia	Philippines	Tunisia	Morocco	Indiana State, US	Ontario Province, Can.	Quebec Province, Can. Mathematics and Science Stud
Singapore	67 (1.1)	1.1		1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1 💆
Chinese Taipei	66 (0.3)	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3 ₹
Japan	65 (0.3)	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Hungary	64 (0.6)	0.6		0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.6	0.6
England	63 (0.7)	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7 0.5 leuds
United States	63 (0.5)	0.5		0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Latvia	63 (0.5)	0.5	0.5	0.7	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	<
Hong Kong, SAR	62 (0.7)	0.7	0.7	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	
Russian Federation	61 (0.9)	0.9	-	1.1	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	8.0 800 800 800
Australia	61 (0.8)	0.8		0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.7	0.7	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.7	0.8	0.8	0.8
Netherlands	60 (0.5)	0.5		0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5
New Zealand	59 (0.5)	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Belgium (Flemish)	59 (0.7) 59 (0.4)	0.7		0.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.4	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Lithuania	59 (0.4)	0.5	-	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5
Scotland	56 (0.6)	0.6		0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6
Slovenia	54 (0.5)	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Moldova, Rep. of	53 (0.8)	0.8	-	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Cyprus	53 (0.4)	0.5	0.4	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.4
Norway	52 (0.4)	0.4	-	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Iran, Islamic Rep. of	41 (0.7)	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.8	0.8	0.7	0.9	0.8	0.8	0.8	0.8
Armenia	41 (0.7)	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.8
Philippines	31 (1.3)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.3	1.3	1.3	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.3	1.4	1.3	1.3
Tunisia	27 (0.6)	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.6	0.7	0.7	0.6	0.7	0.6	0.6	0.7	0.6	0.7	0.6	0.6	0.7	0.7	0.7	0.6	0.6
Morocco	27 (0.6)	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.7	0.7	0.7	0.6	0.6
International Avg.	55 (0.1)	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benchmarking Participants																													
Indiana State, US	66 (0.8)	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.8	0.8	0.7	0.8	0.8
Ontario Province, Can.	65 (0.7)	0.7	0.7	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.6	0.7	0.7
Quebec Province, Can.	58 (0.5)	0.6	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.5
Number of Items (Score Points) Identified*	165	130	69	44	161	134	161	161	140	108	155	115	136	134	126	161	122	136	161	130	150	123	161	66	89	100	68	149	148

Of the 152 items in the Science test, some extended-response items were scored on a two-point scale, resulting in 168 total score points. Following item review, some items were deleted and response categories were combined for a number of items, resulting in 150 items and 165 total score points.

<sup>( )</sup> Standard errors for the average percent of correct responses on all items appear in parentheses. The matrix contains standard errors corresponding to the average percent correct responses based on TCMA subset of items, as displayed in Table C.1.

It is clear that the selection of items does not have a major effect on the general relationship among countries. Countries that had relatively high or low performance across all the science items also had relatively high or low performance on each of the various sets of items selected for the TCMA. For example, at the eighth grade, Singapore had the highest average percent correct on the test as a whole and on all of the different item selections, with Chinese Taipei, Estonia, and Korea next in order of performance on practically all selections of items. Although there are some changes in the ordering of countries based on the items selected for the TCMA, most of these differences are within the boundaries of sampling error. As an example, consider the 195 score points selected by Armenia. The students in Armenia did a little better on these items than on the test as a whole, with 39 percent correct on these items, on average, compared with 38 percent correct on all items. However, most other countries also did better on these particular items, with an international average of 44 percent correct on the items selected by Armenia. All 29 participants that performed better than Armenia on the overall test also performed better on the items selected by Armenia.

The TCMA results provide evidence that the TIMSS 2003 science test provides a reasonable basis for comparing achievement of the participating countries and benchmarking entities. This result is not unexpected, since making the test as fair as possible was a major consideration in test development. The fact that the majority of countries indicated that most items were appropriate for their students means that the different average percent correct estimates were based on essentially the same items. Insofar as countries rejected items that would be difficult for their students, these items tended to be difficult for students in other countries as well. The analysis shows that omitting such items tends to improve the results for that country, but also tends to improve the results for all other countries, so that the overall pattern of results is largely unaffected.