Chapter 4

Students' Backgrounds and Attitudes Towards Science

With its overarching goal of improving student learning in mathematics and science, TIMSS focuses primarily on curricular, instructional, and school resource factors in presenting information on the context in which learning takes place. However, as documented extensively by previous IEA studies of science achievement,[1] student achievement also is related to home background factors, and to students' activities and attitudes. Since information on such factors is indispensable for interpreting the achievement results, this chapter provides detailed information about students' home backgrounds and resources for learning, how they spend their time out of school, their self-confidence in learning science, and the value they place on science. Also provided is information on trends in attitudes to learning science across 1995, 1999, and 2003.

What Educational Resources Do Students Have in Their Homes?

IEA's ongoing assessments of student achievement in mathematics and science (TIMSS) and reading literacy (PIRLS) have shown that in almost every country, students from homes with extensive educational resources have higher achievement in science and other subjects than

1 (2000), *TIMSS 1999 International Science Report: Findings from IEA's Repeat of the Third International Mathematics and Science Study at the Eighth Grade,* . (1 6), *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study,*

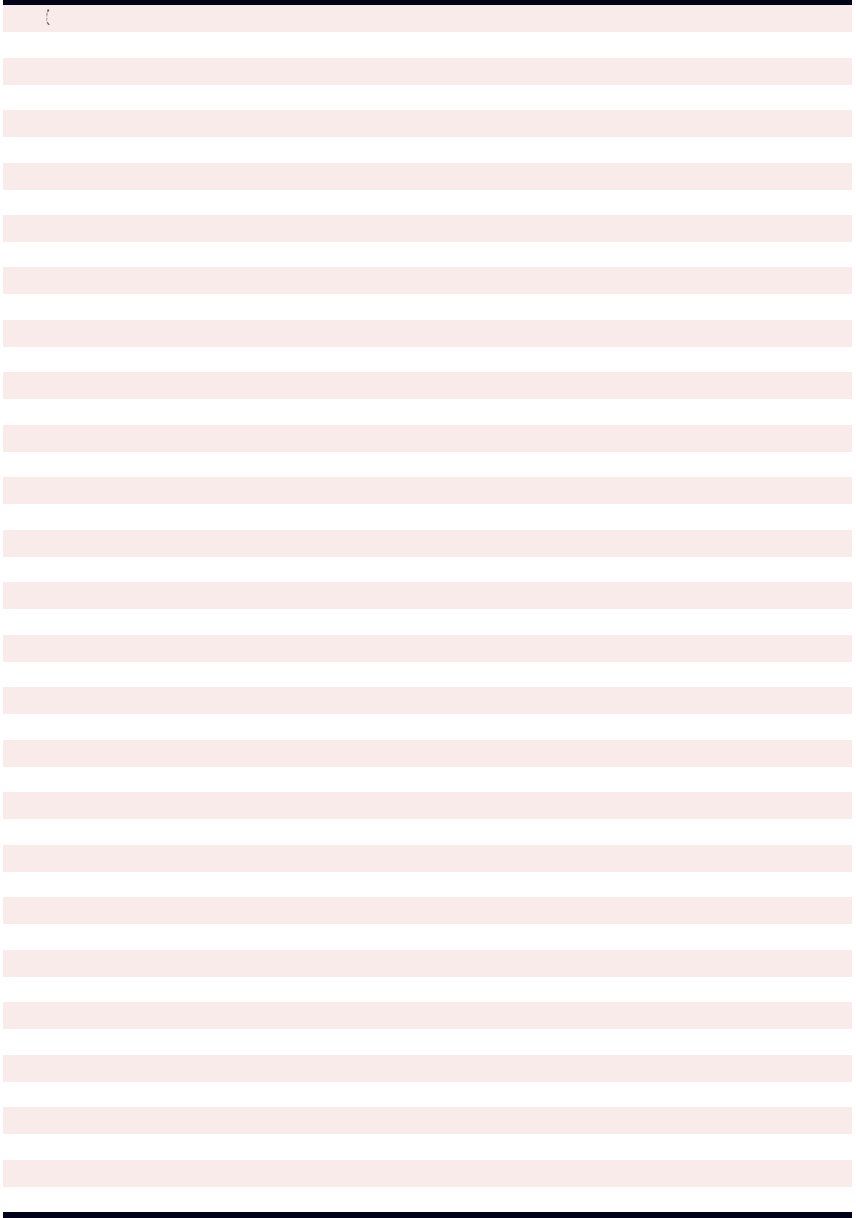
those from less advantaged backgrounds. For the 2003 data presented in this report, TIMSS has focused on just a few central variables: level of parental education, students' educational aspirations, speaking the language of the test at home, having a range of study aids in the home and computer use at home, and at school.

Because for most children, parents are their first and probably most important educators, the level of education of the parents may be the most important educational resource in the home. Exhibit 4.1 summarizes eighth-grade students' reports of the highest level of education attained by their parents. Ordered alphabetically by country, this two-page display shows the percentages of students in each of five categories of parents' educational level, together with their average science achievement. Standard errors for percentages and averages also are shown. The education level of the parent with most education was used in assigning students to categories.

Although response rates to questions in the TIMSS questionnaires generally were high, students in some countries had difficulty in answering specific questions, particularly those about their parents' level of education. The exhibits in this chapter have special notations on this point. For a country where responses are available for at least 70 but less than 85 percent of the students, an "r" is included next to its data. Where responses are available for at least 50 but less than 70 percent of the students, an "s" is included. Where responses are available for less than 50 percent, an "x" replaces the data.

Exhibit 4.1 reveals great diversity in levels of parental education within and across the TIMSS countries. On average across countries, the percentages of eighth-grade students reporting that the highest level of education attained by either parent was as follows: finished university – 28%; finished post-secondary education but not university – 17%; finished upper secondary – 28%; finished lower secondary – 15%; and no more than primary (includes not attending school at all) – 12%. Countries with the highest percentages (40% or more) of students reporting university-educated parents included Armenia, Estonia,

	51 (1.5)	475 (4.1)	22 (0.)	461 (4.4)	24 (1.1)	451 (4.8)
	2 (1.3)	564 (4.7)	27 (1.0)	540 (4.7)	25 (1.1)	517 (4.6)
	33 (0.7)	462 (2.6)	7 (0.5)	446 (5.6)	23 (0.6)	44 (3.5)
( )	25 (1.4)	542 (3.2)	26 (1.0)	540 (3.0)	31 (1.1)	516 (3.5)
	10 (0.7)	41 (8.8)	14 (0.6)	388 (4.4)	16 (0.8)	360 (4.1)
	28 (1.3)	4 4 (10.1)	36 (1.4)	485 (5.2)	2 (1.4)	46 (6.3)
	16 (1.0)	480 (4.3)	10 (0.5)	444 (4.6)	32 (1.1)	415 (3.2)
	17 (1.4)	61 (3.7)	11 (0.6)	5 3 (4.2)	46 (1.0)	568 (3.3)
	28 (0.8)	470 (3.5)	14 (0.7)	45 (3.7)	36 (0.)	43 (3.4)
	24 (1.1)	482 (4.8)	0 (0.0)	/ /	11 (0.6)	452 (6.6)
	40 (1.4)	574 (3.1)	3 (1.1)	548 (2.7)	1 (0.7)	534 (3.4)
	10 (0.7)	310 (.5)	17 (0.)	285 (8.5)	22 (1.0)	276 (7.3)
	12 (1.0)	577 (5.)	12 (0.5)	565 (4.3)	36 (0.)	558 (3.0)
	37 (1.6)	580 (3.1)	0 (0.0)	/ /	4 (1.6)	530 (2.8)
	(0.)	465 (6.7)	6 (0.5)	438 (6.4)	24 (1.1)	433 (5.1)
	10 (0.8)	4 0 (5.7)	10 (0.7)	471 (3.8)	15 (0.8)	475 (3.)
	45 (1.3)	523 (3.)	24 (0.)	487 (4.2)	18 (0.)	468 (5.0)
	21 (1.3)	514 (5.7)	5 (0.4)	507 (6.1)	40 (0.)	501 (3.1)
	45 (1.4)	576 (2.5)	18 (0.7)	555 (3.2)	36 (1.1)	536 (2.5)
	35 (1.8)	506 (5.2)	15 (0.8)	488 (4.)	30 (1.0)	475 (3.6)
	35 (1.2)	580 (2.2)	15 (0.6)	560 (3.0)	41 (1.0)	551 (2.0)
	43 (1.8)	532 (3.7)	0 (0.0)	/ /	34 (1.4)	517 (3.5)
	1 (1.2)	434 (6.7)	21 (1.0)	4(3.5)		



at home in relation to their average science achievement, shows that this remains true for the TIMSS 2003 countries, and holds also for science achievement at the fourth grade. At both eighth and fourth grades, students from homes where the language of the test is always or almost always spoken had higher average achievement than those who spoke it less frequently.

Whereas in most countries a large majority of students at each grade are from homes where the language of the test is spoken frequently, on average, internationally, about 20 percent of students were from homes where the language of the test was spoken only sometimes, or never. Countries where the majority of students speak the language of the test so infrequently included Botswana, Ghana, Indonesia, Lebanon, the Philippines, Singapore, and South Africa at the eighth grade, and Morocco, the Philippines, and Singapore at the fourth grade. Although in general average science achievement in such countries was relatively low, Singapore was a notable exception, with average achievement above the international average even among those rarely speaking the language of the test at home.

Many countries tested in more than one language in order to cover their whole student population. These included Bahrain (Arabic and English), Egypt (Arabic, English, and French), Estonia (Estonian and Russian), Hong Kong SAR (Chinese and English), Israel (Hebrew and Arabic), Latvia (Latvian and Russian), Lebanon (French and English) Macedonia (Macedonian and Albanian), Moldova (Moldavian and Russian), New Zealand (English and Maori at grade 4 only), Norway (Bokmål and Nynorsk), the Palestinian National Authority (Arabic and English), Romania (Romanian and Hungarian), the Slovak Republic (Slovak and Hungarian), and South Africa (English and Afrikaans). Among benchmarking participants, the Basque Country, Spain tested in Basque and Castilian, and the Canadian provinces of Ontario and Quebec in English and French. However, in countries like Botswana, Ghana, Indonesia, Morocco, the Philippines, Singapore, and South Africa, testing in all possible dialects and languages was prohibitive.

	80 (1.0)	460 (3.7)	16 (0.8)	474 (4.1)	4 (0.5)	446 (11.6)	0 (0.1)	
	80 (2.3)	52 (3.5)	12 (1.1)	524 (8.8)	7 (1.3)	521 (13.2)	1 (0.4)	
	66 (1.1)	437 (2.1)	15 (0.7)	460 (3.6)	15 (0.7)	42 (4.0)	4 (0.5)	430 (5.)
	77 (1.3)	526 (2.2)	11 (0.6)	506 (6.1)	(0.8)	45 (.2)	4 (0.6)	48 (8.7)
	5 (0.3)	374 (13.5)	6 (0.4)	412 (10.)	80 (0.8)	366 (2.5)	(0.6)	316 (6.5)
	81 (2.0)	482 (5.4)	10 (0.8)	4 4 (8.7)	8 (1.4)	445 (11.3)	1 (0.3)	

	84 (1.0)	440 (4.7)	11 (0.7)	448 (5.)	4 (0.4)	413 (10.5)	1 (0.2)	/ /
	80 (1.7)	525 (4.6)	11 (0.)	525 (4.)	8 (1.0)	4 3 (8.5)	1 (0.2)	/ /
( )	68 (1.4)	525 (1.6)	16 (0.)	520 (2.7)	12 (1.2)	487 (5.4)	4 (0.5)	500 (6.)
	31 (1.2)	568 (2.3)	41 (0.8)	553 (2.0)	26 (1.1)	533 (2.8)	1 (0.1)	/ /
	72 (1.1)	481 (2.4)	14 (0.7)	4 1 (4.3)	11 (0.6)	46 (5.0)	3 (0.3)	467 (7.0)
	82 (1.3)	544 (3.7)	12 (0.8)	54 (5.8)	5 (0.7)	484 (7.2)	1 (0.2)	/ /
	51 (1.3)	558 (3.5)	24 (0.8)	535 (3.3)	21 (1.0)	523 (3.6)	4 (0.4)	4 5 (5.4)
	1 (0.6)	531 (2.)	8 (0.6)	540 (5.7)	1 (0.2)	/ /	0 (0.1)	/ /
	53 (3.4)	434 (4.7)	6 (0.5)	438 (8.2)	21 (1.)	407 (5.1)	20 (2.5)	368 (7.3)

Earlier IEA studies have shown that students from homes with extensive literacy resources have higher achievement than those from less advantaged backgrounds. For example, TIMSS 1999 has shown a consistent relationship between number of books in the home and student achievement in both mathematics and science at the eighth grade,[2] and PIRLS 2001 demonstrated a similar relationship with reading literacy at the fourth grade.[3] Providing further information on this topic, Exhibit 4.4 shows for each country at both eighth and fourth grades the percentage of students at each of five ranges of number of books in the home in relation to average science achievement. This exhibit reveals a wide range both across and within each country. For example, the percentage of eighth-grade students reporting more than 200 books in their homes exceeded 30 percent in Australia, Estonia, Hungary, and Sweden, whereas in Botswana, Egypt, Ghana, Indonesia, Iran, Morocco, the Philippines, and South Africa, more than 30 percent of students were from homes with 10 books or less. The situation among fourth-grade students was similar.

Across countries, on average, 15 percent of eighth-grade students were from homes with more than 200 books, 13 percent from homes with 101-200 books, 27 percent from homes with 26-100 books, 26 percent from homes with 11-25 books, and 18 percent with 0-10 books. There also was a clear-cut relationship, on average, between number of books in the home and science achievement. Eighth-grade students reporting more than 200 books in their homes had an average

	24 (0.)	453 (4.8)	15 (0.)	433 (5.2)
	11 (0.8)	4 3 (5.8)	5 (0.5)	464 (8.7)
	26 (0.8)	423 (3.0)	11 (0.5)	420 (5.0)
( )	25 (0.8)	503 (4.0)	14 (0.7)	477 (5.7)
	30 (0.)	368 (3.4)	48 (1.3)	348 (3.0)
	15 (0.7)	470 (6.3)	14 (1.6)	44 (11.8)

	22 (0.)	437 (6.4)	17 (1.2)	416 (6.)
	13 (0.)	487 (6.8)	6 (0.8)	464 (10.2)
( )	23 (0.)	506 (2.5)	8 (0.5)	484 (5.2)
	24 (0.8)	540 (2.2)	17 (0.8)	516 (2.6)
	2 (1.0)	476 (2.)	11 (0.7)	453 (4.8)
	17 (1.0)	511 (4.5)	8 (0.8)	475 (6.3)
	30 (0.8)	540 (3.2)	25 (1.4)	533 (4.0)
	22 (0.)	506 (4.1)	8 (0.7)	47 (6.2)
	22 (1.2)	43 (5.4)	55 (2.1)	3 6 (4.5)
	33 (1.0)	511 (4.3)	18 (0.)	4 8 (6.8)
	28 (0.8)	52 (2.4)	12 (0.8)	514 (3.6)
	18 (0.)	515 (3.3)	6 (0.7)	4 1 (6.6)
	34 (1.1)	506 (3.2)	13 (0.)	476 (6.0)
	31 (1.4)	4 3 (5.4)	30 (1.4)	475 (6.)
	26 (1.5)	320 (7.8)	60 (2.1)	304 (8.1)
	21 (1.1)	515 (2.8)	(0.8)	486 (5.6)
	17 (0.6)	4 1 (4.)	(0.7)	463 (6.2)
	17 (0.8)	445 (4.4)	7 (0.5)	418 (7.0)
	27 (1.1)	368 (11.6)	48 (2.1)	2 (7.2)
	27 (1.5)	516 (5.7)	10 (0.7)	4 (8.5)
	20 (1.1)	481 (3.6)	11 (0.7)	461 _ .6(0.7))(506)-387.6((3.2))-46 32 t _ . 38 . 0 (_) /-5 1 . 15.068 0 . -0

Computer and Study Desk/Table in the Home

Countries	Have Computer		Do Not Have Computer		Have Study Desk/Table		Do Not Have Study Desk/Table	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
	28 (1.2)	446 (5.4)	72 (1.2)	438 (4.6)	60 (1.5)	447 (4.)	40 (1.5)	430 (5.0)
	2 (0.)	526 (3.)	8 (0.)	478 (8.3)	85 (1.1)	526 (3.5)	15 (1.1)	501 (8.3)
( )	0 (0.5)	520 (1.)	10 (0.5)	505 (3.5)	1 (0.5)	51 (1.)	(0.5)	517 (3.0)
	8 (0.7)	555 (1.8)	11 (0.7)	524 (3.2)	87 (0.6)	554 (1.7)	13 (0.6)	53 (3.5)
	75 (0.7)	485 (2.6)	25 (0.7)	471 (3.5)	0 (0.5)	485 (2.4)	10 (0.5)	44 (4.3)
	1 (0.6)	545 (3.6)	(0.6)	508 (6.7)	80 (1.1)	544 (3.7)	20 (1.1)	52 (4.4)
	85 (1.0)	544 (3.0)	15 (1.0)	537 (4.2)	71 (1.1)	541 (3.2)	2 (1.1)	548 (3.4)
	71 (1.2)	543 (2.)	2 (1.2)	510 (4.0)	6 (0.5)	533 (2.8)	4 (0.5)	482 (8.)
	25 (1.7)	445 (5.2)	75 (1.7)	406 (4.4)	40 (1.8)	448 (4.8)	60 (1.8)	3 6 (4.4)
	7 (0.7)	51 (3.5)	21 (0.7)	507 (6.1)	72 (0.)	523 (3.)	28 (0.)	501 (4.6)
	77 (0.8)	548 (1.7)	23 (0.8)	532 (2.7)	4 (0.4)	545 (1.5)	6 (0.4)	530 (5.6)
	42 (1.4)	538 (3.1)	58 (1.4)	52 (2.)	1 (0.7)	533 (2.5)	(0.7)	523 (5.3)
	45 (1.4)	521 (3.4)	55 (1.4)	508 (2.7)	7 (0.3)	514 (2.6)	3 (0.3)	48 (10.4)
	20 (1.1)	4 (6.0)	80 (1.1)	4 (4.5)	81 (1.2)	502 (4.8)	1 (1.2)	478 (6.4)
	20 (1.2)	327 (.4)	80 (1.2)	307 (7.0)	52 (1.8)	323 (7.6)	48 (1.8)	2 8 (8.3)
	3 (0.6)	527 (1.8)	7 (0.6)	500 (6.8)	4 (0.5)	526 (1.)	6 (0.5)	516 (6.)
	87 (0.7)	530 (2.2)	13 (0.7)	483 (5.3)	80 (0.7)	52 (2.3)	20 (0.7)	4 8 (4.2)
	1 (0.5)	471 (2.7)	(0.5)	440 (4.5)	2 (0.5)	471 (2.6)	8 (0.5)	428 (6.1)
	26 (1.7)	382 (1 .4)	74 (1.7)	31 (7.3)	6 (1.3)	350 (.)	31 (1.3)	303 (10.5)
	23 (1.1)	533 (6.5)	77 (1.1)	525 (5.2)	83 (0.)	530 (5.3)	17 (0.)	516 (6.2)
	8 (0.8)	506 (2.)	11 (0.8)	488 (5.)	77 (1.1)	50 (2.)	23 (1.1)	483 (4.8)
	8 (0.8)	573 (5.4)	11 (0.8)	511 (5.)	0 (0.7)	572 (5.3)	10 (0.7)	511 (8.8)
	77 (1.0)	501 (3.0)	23 (1.0)	471 (3.4)	1 (0.6)	4 2 (2.7)	(0.6)	480 (7.0)
	26 (1.3)	348 (7.7)	74 (1.3)	30 (5.)	64 (1.8)	334 (6.4)	36 (1.8)	2 7 (6.8)
	2 (0.4)	541 (2.4)	8 (0.4)	4 2 (3.)	77 (0.8)	545 (2.3)	23 (0.8)	511 (4.0)
	65 (0.2)	4 (1.2)	35 (0.2)	472 (1.1)	80 (0.2)	4 6 (1.0)	20 (0.2)	470 (1.5)
Benchmarking Participants								
	0 (0.8)	558 (3.6)	10 (0.8)	520 (6.3)	80 (0.)	558 (3.8)	20 (0.)	540 (5.4)
	2 (0.6)	544 (4.0)	8 (0.6)	506 (6.)	83 (1.1)	545 (4.0)	17 (1.1)	521 (5.1)
	8 (0.8)	504 (2.4)	11 (0.8)	477 (5.0)	86 (0.)	504 (2.4)	14 (0.)	480 (4.7)

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	81 (1.5)	557 (1.7)	5 (1.3)	543 (6.5)	12 (0.7)	522 (3.0)
	80 (1.6)	531 (3.4)	7 (0.8)	503 (8.4)	11 (1.1)	475 (10.5)
	7 (1.0)	547 (3.6)	8 (0.6)	533 (7.7)	11 (0.8)	505 (6.1)
	7 (2.0)	528 (2.0)	12 (1.7)	524 (3.3)	4 (0.4)	4 6 (13.6)
	78 (1.0)	508 (2.8)	8 (0.7)	482 (6.3)	12 (0.7)	484 (5.2)
	76 (1.3)	547 (3.1)	(0.)	51 (5.2)	11 (0.)	541 (4.6)
	73 (1.2)	547 (2.3)	12 (0.)	525 (6.5)	11 (0.6)	4 1 (4.0)
	71 (1.4)	578 (5.2)	17 (1.0)	551 (6.3)	8 (0.6)	50 (7.7)
	71 (1.1)	533 (2.3)	12 (0.8)	511 (5.7)	13 (0.7)	47 (4.6)
	66 (1.4)	524 (1.)	21 (1.5)	513 (2.)	6 (0.6)	508 (4.)
	60 (1.7)	473 (2.)	28 (1.6)	473 (3.7)	5 (0.5)	43 (.3)

Science achievement was positively related to computer usage, particularly at eighth grade, with average achievement highest among students reporting using computers at home and at school (490 points). Next highest was achievement among students using computers at home but not school (476 points), followed by students using computers at school but not home (450 points). Countries with the greatest percentages of eighth-grade students using computers at home and at school included Hong Kong SAR, Chinese Taipei, Australia, England, and Indiana (80% or more), as well as Singapore, the United States, The Netherlands, Sweden, Scotland, Israel, New Zealand, Norway, and Cyprus (70% or more).

How Much of Their Out-of-School Time Do Students Spend on Homework During the School Week?

One of the major ways that students can consolidate and extend classroom learning is to spend time out of school studying or doinftudenth(lOCcS

average science achievement. Countries are ordered by the percentage of students at the high level of the index. Also, the 17 countries that taught biology, earth science, chemistry, and physics as separate science subjects at eighth grade are presented in separate panels for each subject. Twenty-seven of the countries and all four benchmarking participants at the eighth grade taught science as a single subject. Among these, 13 percent of students were at the high level of the *time spent on science homework* index, 44 percent at the medium level, and 43 percent at the low level. Countries with the greatest emphasis on homework included Ghana, Egypt, the Palestinian National Authority, and Malaysia, where 20 percent or more of the students were at the high level of the index. In these countries, homework seems to be an important part of teachers' instructional strategy. In contrast, there seems to be relatively little emphasis on homework in Australia, Chile, England, Hong Kong SAR, Iran, Japan, Korea, Saudi Arabia, Scotland, and Tunisia, as well as the Canadian provinces of Ontario and Quebec, where less than 10 percent of students were at the high level of the index. Included in this group are several of the countries with the highest achievement levels – Hong Kong SAR, Japan, and Korea.

In countries teaching eighth-grade biology as a separate subject, nine percent of students on average were at the high level of the index, compared with 10 percent for earth science, and 14 percent each for chemistry and physics. Among these separate-science-subject countries, the Russian Federation, Moldova, and Armenia had the greatest percentages of students at the high level of the science homework index. It is noteworthy that there are several high-achieving countries among those at the low level of the homework index, including Belgium (Flemish), Hungary, The Netherlands, the Slovak Republic, and Sweden.

In general, less science homework is assigned at the fourth grade, with six percent of students on average at the high level of the index, 33 percent at the middle level, and 61 percent at the low level.

Index of Time Students Spend Doing Science Homework (TSH) in a Normal School Week

8

Index of Time Students Spend Doing Science Homework

Countries	High		Medium		Low	
General/ Integrated Science						
	25 (1.2)	267 (8.5)	54 (1.0)	262 (6.0)	22 (1.0)	258 (8.1)
	23 (0.7)	416 (4.4)	64 (0.8)	436 (4.0)	13 (0.6)	430 (6.6)
	21 (1.1)	433 (4.4)	56 (1.3)	442 (3.4)	23 (1.3)	441 (4.8)
	20 (1.0)	513 (4.4)	4 (0.)	510 (3.6)	31 (1.3)	510 (4.6)
	1 (0.)	466 (4.2)	52 (1.2)	478 (3.)	2 (1.5)	4 (5.0)
	18 (0.7)	5 5 (4.1)	48 (0.7)	585 (4.4)	34 (0.)	564 (5.5)
d	17 (0.7)	381 (7.5)	50 (0.8)	37 (5.7)	33 (1.2)	381 (7.2)
	17 (0.7)	234 (.6)	52 (0.)	246 (7.)	32 (0.)	263 (7.4)
	14 (0.7)	378 (6.1)	45 (1.0)	368 (3.2)	40 (1.2)	366 (3.6)
	14 (1.0)	48 (5.)	41 (1.1)	487 (3.7)	45 (1.4)	4 6 (3.7)
	14 (0.7)	3 1 (5.3)	47 (1.1)	3 6 (3.4)	3 (1.3)	408 (3.5)
	13 (0.7)	426 (4.1)	56 (1.3)	441 (2.5)	31 (1.4)	445 (2.6)
	13 (0.8)	485 (3.7)	44 (1.2)	4 3 (3.1)	43 (1.7)	503 (2.3)
	13 (0.)	480 (4.7)	43 (1.6)	485 (4.3)	44 (2.0)	505 (3.4)
	13 (0.7)	51 (4.3)	43 (1.4)	530 (3.4)	45 (1.7)	531 (3.7)
a	12 (1.2)	588 (4.6)	37 (1.3)	581 (4.0)	51 (2.1)	561 (3.5)
	10 (1.3)	51 (6.2)	41 (1.6)	531 (6.)	48 (2.0)	518 (5.1)
	(0.8)	520 (6.4)	35 (1.6)	530 (3.3)	56 (2.0)	530 (4.4)
	(0.6)	3 8 (4.0)	35 (0.)	400 (2.8)	56 (1.2)	411 (2.6)
	8 (0.7)	451 (5.6)	42 (1.4)	457 (2.)	4 (1.7)	452 (2.7)
	8 (0.6)	408 (5.2)	38 (0.8)	413 (3.5)	54 (1.1)	415 (3.0)
	8 (0.7)	382 (6.0)	61 (1.5)	402 (4.6)	31 (1.7)	403 (4.6)
	6 (0.5)	548 (4.6)	43 (1.4)	563 (2.)	50 (1.4)	554 (3.)
	4 (0.4)	54 (6.3)	26 (1.7)	562 (2.4)	70 (2.0)	55 (1.)
	3 (0.4)	487 (14.2)	27 (1.4)	508 (5.0)	71 (1.5)	517 (3.4)
	2 (0.3)		22 (1.4)	54 (3.5)	76 (1.6)	557 (2.0)
¶	(1.3)	576 (.6)	38 (1.5)	556 (5.0)	53 (1.8)	537 (5.2)
	13 (0.2)	458 (1.3)	44 (0.2)	466 (0.)	43 (0.3)	467 (0.)
Benchmarking Participants						
	14 (1.1)	485 (4.2)	42 (1.8)	4 1 (4.0)	44 (2.4)	48 (3.3)
	12 (1.2)	520 (6.3)	50 (2.8)	537 (4.6)	37 (3.0)	52 (7.4)
	8 (0.)	532 (5.7)	37 (1.8)	534 (3.7)	55 (2.3)	533 (2.8)
	6 (0.6)	524 (6.8)	26 (1.6)	52 (4.6)	68 (1.8)	534 (3.2)

( ).

( )

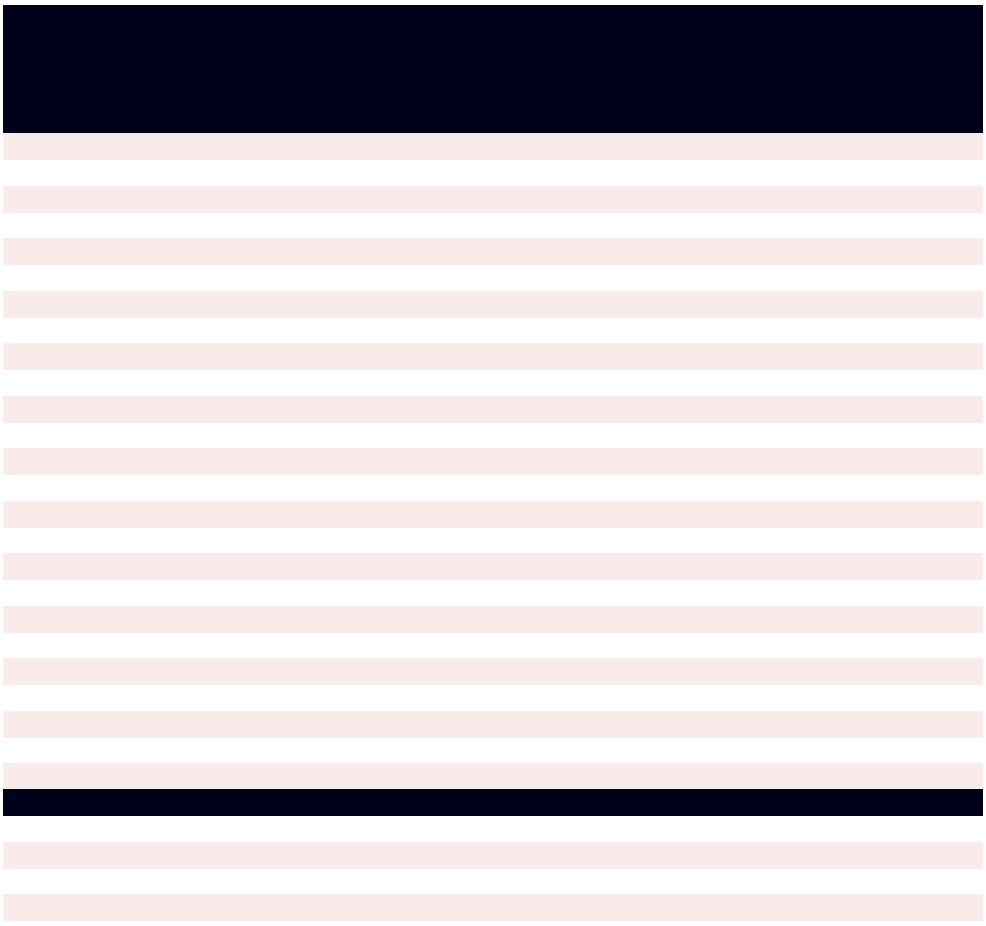
0 5%

Biology

	27 (1.1)	47 (4.4)	54 (1.1)	473 (3.)	1 (1.1)	475 (5.4)
	23 (1.2)	507 (4.8)	52 (1.0)	515 (4.0)	24 (1.2)	526 (3.6)
	17 (1.0)	471 (5.3)	51 (1.2)	466 (4.0)	32 (1.4)	466 (4.3)
b	16 (0.)	376 (5.)	45 (1.1)	387 (5.0)	3 (1.5)	417 (5.5)
	15 (0.6)	423 (4.4)	52 (0.8)	424 (4.1)	33 (0.)	427 (4.8)
	14 (1.0)	505 (4.1)	45 (1.2)	508 (3.2)	41 (1.5)	524 (2.)
	11 (0.8)	504 (5.6)	41 (1.2)	515 (2.7)	47 (1.5)	52 (2.)
	10 (0.8)	537 (4.4)	46 (1.3)	547 (2.7)	44 (1.5)	564 (3.1)
	6 (0.6)	417 (11.1)	31 (1.7)	431 (4.)	63 (1.)	475 (3.5)
	6 (0.6)	443 (.1)	24 (1.2)	45 (8.6)	70 (1.5)	483 (4.8)
	5 (0.5)	478 (.4)	26 (1.3)	474 (5.8)	6 (1.6)	485 (5.5)
	4 (0.4)	427 (8.1)	24 (1.3)	452 (4.)	72 (1.4)	481 (2.7)
	4 (0.4)	516 (8.0)	28 (1.3)	524 (4.0)	6 (1.4)	555 (2.8)
	3 (0.4)	426 (8.4)	14 (0.)	403 (4.1)	83 (1.0)	453 (2.2)

Chemistry

	40 (1.2)	516 (4.5)	47 (1.0)	516 (3.5)	13 (0.8)	521 (5.4)
	31 (1.0)	47 (4.2)	52 (1.0)	473 (3.)	18 (1.0)	472 (4.)
	27 (1.1)	470 (4.8)	52 (1.1)	466 (4.0)	21 (1.0)	464 (4.2)
	18 (0.8)	504 (3.8)	45 (1.0)	518 (2.7)	36 (1.2)	533 (3.0)
	18 (1.1)	500 (4.3)	46 (1.0)	512 (2.)	36 (1.4)	524 (3.3)
	16 (1.2)	537 (4.1)	45 (1.0)	546 (2.6)	3 (1.6)	56 (3.1)
	16 (1.0)	372 (5.4)	45 (1.3)	38 (5.3)	3 (1.4)	416 (5.2)
	11 (0.)	425 (8.2)	36 (1.3)	440 (4.4)	53 (1.7)	477 (3.)
	11 (0.)	454 (6.3)	35 (1.3)	471 (7.2)	55 (1.7)	483 (4.7)
	10 (0.)	446 (5.4)	37 (1.1)	465 (4.1)	53 (1.6)	482 (3.1)
	10 (0.5)	424 (4.7)	43 (0.)	442 (2.6)	48 (1.1)	455 (2.3)
	(0.8)	468 (8.7)	32 (1.3)	47 (5.7)	60 (1.8)	487 (5.7)
	8 (0.7)	510 (5.2)	33 (1.2)	532 (3.3)	60 (1.5)	556 (3.2)
	5 (0.5)	485 (5.)	22 (1.2)	502 (3.3)	73 (1.4)	530 (2.0)
	4 (0.5)	385 (10.1)	14 (0.)	38 (7.0)	83 (1.1)	435 (3.)
	2 (0.4)		38 (1.2)	523 (3.)	60 (1.3)	533 (2.5)
	2 (0.2)		1 (1.1)	4 4 (3.)	7 (1.2)	524 (3.5)



Countries			0.02)(0.04)	1.2				
	1.8 (0.03)	0. (0.03)	1.6 (0.03)	0.4 (0.02)	1.2 (0.03)	1.6 (0.03)	0.7 (0.03)	1.0 (0.04)
	2.0 (0.03)	0. (0.02)	1.7 (0.04)	1.0 (0.02)	1.6 (0.03)	0.7 (0.02)	1.3 (0.04)	0.4 (0.03)
	2.0 (0.03)	1.2 (0.02)	1.6 (0.03)	1.2 (0.02)	1.5 (0.03)	0. (0.02)	1.4 (0.03)	0.6 (0.02)
( )	2.1 (0.03)	1.0 (0.03)	1. (0.03)	0. (0.02)	1.6 (0.03)	0.5 (0.01)	1.3 (0.03)	0.2 (0.02)
	1.4 (0.03)	0.5 (0.02)	2.1 (0.04)	2.3 (0.03)	1.5 (0.02)	1.8 (0.03)	0.7 (0.02)	0.6 (0.03)
	2.5 (0.04)	1.1 (0.04)	2.6 (0.05)	1.5 (0.03)	1.2 (0.04)	0.7 (0.03)	1.0 (0.04)	0.3 (0.02)
	2.2 (0.02)	0.7 (0.02)	2.3 (0.02)	1.5 (0.02)	1.8 (0.03)	0.6 (0.01)	0.7 (0.02)	0.3 (0.02)
	1.7 (0.03)	1.4 (0.04)	1.4 (0.03)	0.7 (0.01)	1.0 (0.02)	1.0 (0.02)	1.4 (0.04)	0.2 (0.01)
	2.1 (0.03)	1.3 (0.02)	2.1 (0.03)	1.0 (0.03)	1.7 (0.03)	0. (0.02)	1.2 (0.02)	0.6 (0.02)
	0.8 (0.02)	0.7 (0.02)	0.8 (0.02)	1.3 (0.03)	1.1 (0.02)	1.0 (0.02)	0.6 (0.02)	0.6 (0.02)
	2.3 (0.03)	1.1 (0.03)	2.8 (0.03)	1.1 (0.02)	1.4 (0.03)	0.7 (0.02)	1.5 (0.04)	0.4 (0.02)
	0.7 (0.02)	0.6 (0.02)	1.2 (0.03)	1.5 (0.03)	1.3 (0.02)	1.7 (0.03)	0.8 (0.03)	0.8 (0.03)
	2.3 (0.03)	2.0 (0.04)	1.6 (0.03)	0.7 (0.01)	1.0 (0.02)	1.1 (0.02)	2.0 (0.03)	0.1 (0.01)
	2.1 (0.03)	1.1 (0.03)	2.2 (0.03)	1.1 (0.02)	1.5 (0.03)	0.8 (0.02)	0.6 (0.03)	0.2 (0.02)
	1.5 (0.03)	0.5 (0.02)	1.3 (0.03)	2.2 (0.03)	1.1 (0.02)	1.1 (0.02)	0.3 (0.02)	0.8 (0.03)
	1.6 (0.03)	0.4 (0.02)	1.4 (0.03)	1.5 (0.03)	1.4 (0.04)	1.0 (0.02)	0.2 (0.02)	0.7 (0.05)
	2.5 (0.04)	1. (0.03)	2.3 (0.03)	1.4 (0.03)	1.6 (0.03)	0. (0.02)	1.8 (0.04)	0.6 (0.02)
	1.8 (0.03)	1.0 (0.02)	2.6 (0.03)	1.1 (0.03)	1.8 (0.03)	0.7 (0.02)	0.6 (0.02)	0. (0.02)
	2.7 (0.03)	0. (0.02)	1.6 (0.04)	0.6 (0.01)	1.3 (0.03)	0. (0.02)	0.6 (0.02)	0.1 (0.01)
	1.5 (0.03)	0. (0.03)	1.2 (0.03)	1.3 (0.03)	1.2 (0.03)	0. (0.02)	0.6 (0.03)	0.6 (0.03)
	1.7 (0.03)	1.5 (0.03)	1.8 (0.03)	0.7 (0.01)	0.7 (0.02)	0.6 (0.01)	1.7 (0.03)	0.1 (0.01)
	2.4 (0.03)	1.0 (0.02)	2.8 (0.03)	1.6 (0.03)	1.3 (0.03)	0.8 (0.03)	0.8 (0.03)	0.5 (0.02)
	1.8 (0.04)	1.3 (0.03)	1.6 (0.04)	1.3 (0.03)	1.6 (0.03)	1.0 (0.02)	1.0 (0.03)	0.8 (0.03)
	2.1 (0.03)	1.1 (0.03)	2.6 (0.04)	1.6 (0.04)	1.1 (0.03)	0.6 (0.02)	0.7 (0.03)	0.3 (0.02)
	2.3 (0.04)	1.3 (0.03)	2.2 (0.03)	1.6 (0.03)	1.8 (0.03)	1.0 (0.02)	0. (0.03)	0.7 (0.03)
	2.1 (0.04)	0.8 (0.03)	1.5 (0.03)	1.7 (0.02)	1.1 (0.02)	1.2 (0.02)	0.6 (0.02)	0.3 (0.02)
	1. (0.04)	0.7 (0.03)	2.0 (0.04)	2.2 (0.06)	1.3 (0.03)	1.1 (0.03)	0.7 (0.03)	0.5 (0.03)
	1.3 (0.04)	2.3 (0.06)	1.3 (0.03)	1.8 (0.03)	1.5 (0.03)	1.3 (0.03)	2.6 (0.06)	2.8 (0.06)
	2.1 (0.05)	1.2 (0.04)	2.0 (0.05)	0.8 (0.02)	1.7 (0.04)	0.5 (0.02)	1.5 (0.04)	0.8 (0.05)
	2.1 (0.04)	1.0 (0.04)	1.8 (0.05)	1.0 (0.02)	1.5 (0.03)	0.7 (0.03)	1.3 (0.04)	0.6 (0.03)
	2.2 (0.03)	1.2 (0.03)	2.7 (0.03)	1.0 (0.03)	1.8 (0.03)	0.6 (0.02)	1.2 (0.03)	0.7 (0.02)
	1.2 (0.02)	0.7 (0.02)	1.3 (0.03)	1.5 (0.03)	1.1 (0.03)	1.0 (0.02)	0.5 (0.02)	0.6 (0.03)
	1.6 (0.04)	0.6 (0.02)	1.7 (0.03)	1. (0.03)	1.4 (0.02)	1.2 (0.02)	0.5 (0.03)	0.8 (0.04)
	2.0 (0.04)	0. (0.03)	2.1 (0.03)	1.7 (0.05)	1.3 (0.03)	1.0 (0.03)	0.8 (0.04)	0.5 (0.04)
	2.0 (0.03)	1.0 (0.03)	2.5 (0.04)	1.6 (0.03)	1.3 (0.02)	1.1 (0.03)	0.4 (0.02)	0.2 (0.02)
	1.6 (0.05)	1.1 (0.03)	1.3 (0.03)	1.5 (0.04)	1.2 (0.04)	0. (0.02)	0.8 (0.05)	0.8 (0.03)
	2.2 (0.03)	1.4 (0.04)	2.7 (0.03)	0.8 (0.02)	1.7 (0.03)	0.6 (0.02)	1.4 (0.03)	0.5 (0.03)
	2.1 (0.03)	1.0 (0.03)	2.1 (0.03)	1.3 (0.03)	1.7 (0.03)	0.8 (0.02)	0.6 (0.03)	0.3 (0.02)
	2.3 (0.02)	1.4 (0.02)	1.7 (0.02)	0.7 (0.02)	1.4 (0.02)	0. (0.02)	1.6 (0.02)	0.2 (0.02)
	2.5 (0.03)	1.1 (0.03)	2.8 (0.03)	1.5 (0.03)	1. (0.04)	0. (0.02)	0.6 (0.03)	0.4 (0.02)
	2.2 (0.03)	1.3 (0.03)	2.0 (0.03)	1.2 (0.03)	1.7 (0.03)	0.8 (0.02)	1.1 (0.03)	0.4 (0.02)
	1.5 (0.03)	0.7 (0.02)	2.0 (0.03)	1.8 (0.03)	1.6 (0.02)	1.6 (0.03)	0.8 (0.02)	0.8 (0.02)
	2.1 (0.03)	1.1 (0.03)	2.8 (0.03)	1.0 (0.02)	1.6 (0.03)	0.6 (0.02)	1.7 (0.04)	0.4 (0.02)
	1.4 (0.02)	0.8 (0.03)	1.5 (0.02)	1. (0.03)	1.5 (0.02)	1.3 (0.02)	0.7 (0.02)	0.6 (0.02)
	2.2 (0.03)	1.1 (0.02)	2.4 (0.03)	1.2 (0.02)	1.8 (0.02)	0.7 (0.01)	1.8 (0.03)	0.6 (0.02)
¶	2.0 (0.04)	1.1 (0.04)	2.4 (0.05)	0.8 (0.03)	1.4 (0.05)	0.5 (0.02)	1.4 (0.04)	0.5 (0.04)
	1. (0.00)	1.1 (0.00)	1. (0.00)	1.3 (0.00)	1.4 (0.00)	0. (0.00)	1.0 (0.00)	0.6 (0.00)
Benchmarking Participants								
	1.6 (0.04)	0. (0.03)	2.4 (0.04)	0. (0.03)	1.5 (0.03)	0.7 (0.02)	0.8 (0.03)	0.4 (0.03)
	2.2 (0.06)	1.0 (0.04)	2.4 (0.06)	1.2 (0.04)	1.8 (0.04)	0.7 (0.03)	1.7 (0.04)	0.6 (0.05)
	2.1 (0.04)	1.2 (0.04)	2.0 (0.04)	0. (0.02)	1.7 (0.03)	0.8 (0.02)	1. (0.04)	0.6 (0.03)
	2.0 (0.03)	1.4 (0.03)	2.0 (0.04)	0. (0.02)	1.7 (0.04)	0.6 (0.02)	1.5 (0.04)	0.6 (0.02)

	1.6 (0.04)	1.0 (0.04)	1.3 (0.03)	0.5 (0.05)	1.4 (0.03)	1. (0.04)	0.5 (0.04)
	1. (0.04)	1.1 (0.03)	1.8 (0.04)	1.3 (0.03)	1.8 (0.04)	1.2 (0.03)	0. (0.04)
( )	1.8 (0.03)	1.0 (0.02)	2.0 (0.03)	1.2 (0.02)	1.6 (0.03)	0. (0.02)	0.8 (0.02)
	1.3 (0.03)	1.0 (0.03)	1.0 (0.02)	0. (0.02)	1.3 (0.02)	1.1 (0.02)	1.0 (0.03)
	1. (0.03)	1.1 (0.03)	2.1 (0.03)	1.3 (0.03)	1.7 (0.03)	1.2 (0.02)	0.6 (0.02)
	2.0 (0.04)	1.5 (0.04)	2.1 (0.04)	1.0 (0.03)	1. (0.03)	1.0 (0.03)	1.0 (0.03)
	1. (0.03)	1.2 (0.03)	1.2 (0.03)	0. (0.02)	1.1 (0.02)	1.0 (0.02)	0. (0.03)
	1. (0.03)	1.2 (0.03)	2.2 (0.03)	1.3 (0.03)	1.7 (0.03)	1.0 (0.02)	0.4 (0.02)
	1.1 (0.04)	0.3 (0.03)	1.2 (0.05)	1.6 (0.05)	1.4 (0.04)	1.3 (0.04)	0.2 (0.02)
	1.4 (0.03)	0.8 (0.02)	1. (0.03)	1.3 (0.03)	1.6 (0.02)	0. (0.02)	0.4 (0.02)
	2.0 (0.03)	0. (0.02)	1. (0.03)	0.8 (0.02)	1.3 (0.02)	0.8 (0.02)	0.4 (0.01)
	2.0 (0.04)	0. (0.03)	2.6 (0.04)	1.7 (0.04)	1.5 (0.03)	1.1 (0.03)	0.5 (0.03)
	1.7 (0.04)	1.1 (0.03)	2.7 (0.03)	1.8 (0.04)	1.2 (0.03)	1.1 (0.02)	0.5 (0.02)

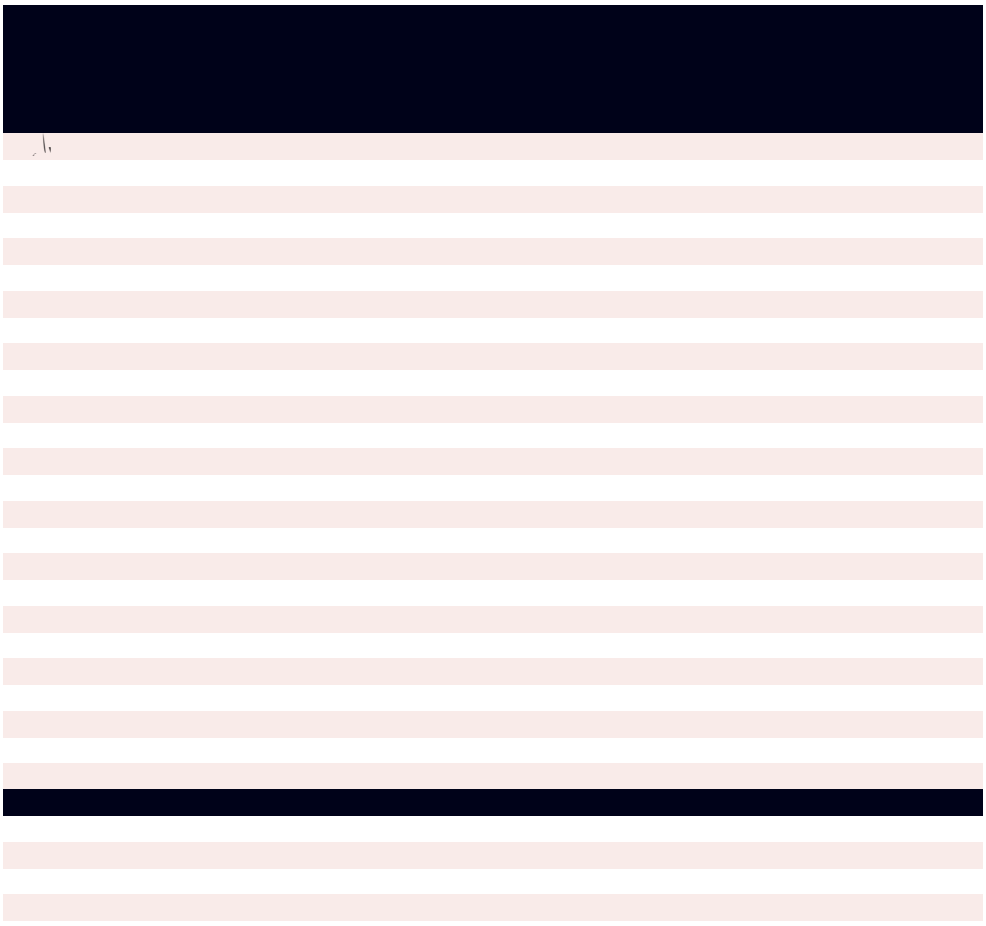
Students who agreed a little or agreed a lot with all four statements on average were assigned to the high level of the index, while students who disagreed a little or disagreed a lot with all four on average were assigned to the low level. The medium level includes all other possible combinations of responses. The percentages of students at each level of this index, and their average science achievement, are presented in Exhibit 4.9 for both eighth and fourth grades. This four-page display summarizes the data in one panel for the countries that teach science as a single subject at the eighth grade, and in separate panels for earth science, biology, physics, and chemistry for countries that teach the sciences separately. There is a single panel also displaying the fourth-grade data.

L -countries, the
apan. and Korea. On average, internationally, almost half (48 percent) of the
t aipei, Hong Kong SAR, eighth-grade students in the single-science countries had high self-confidence in learning science. The percentages ranged from a high of
nt, internationally, 69 percent in Tunisia to a low of 20 percent in Japan. Although there
A4 Tc0.0478 Tw(pws a scean-positive association between self-confi

Index of Students' Self-Confidence

General/ Integrated Science						
	6 (1.1)	412 (2.0)	26 (0.)	38 (3.4)	5 (0.4)	383 (5.0)
	64 (1.1)	452 (3.3)	33 (1.0)	38 (4.4)	4 (0.3)	354 (8.)
	60 (1.3)	512 (2.2)	30 (0.)	475 (2.5)	10 (0.7)	456 (4.5)
	5 (1.0)	515 (2.)	31 (0.)	458 (4.1)	(0.6)	452 (6.1)
	5 (1.5)	53 (3.3)	28 (1.1)	481 (3.5)	14 (0.)	45 (3.)
	58 (1.7)	418 (4.3)	36 (1.3)	378 (4.4)	6 (0.7)	366 (7.3)
	57 (1.0)	503 (3.3)	36 (1.0)	447 (4.4)	6 (0.5)	434 (10.2)
	57 (1.1)	50 (3.2)	32 (1.0)	471 (4.1)	11 (0.6)	45 (5.2)
	57 (1.4)	2 4 (6.1)	36 (1.2)	224 (6.2)	7 (0.6)	173 (11.7)
	56 (1.1)	462 (3.3)	37 (0.)	40 (3.8)	7 (0.5)	384 (6.5)
	56 (1.0)	456 (1.)	36 (0.)	41 (2.3)	8 (0.5)	413 (5.3)
	56 (0.)	548 (3.4)	31 (0.7)	507 (3.4)	13 (0.6)	4 5 (3.4)
	4 (1.4)	550 (4.0)	34 (1.1)	513 (3.6)	17 (0.)	4 (4.8)
	48 (1.6)	416 (2.)	42 (1.7)	386 (3.5)	10 (0.)	37 (6.)
	47 (1.1)	473 (2.5)	45 (0.)	438 (2.7)	8 (0.5)	42 (3.5)
	46 (1.0)	3 1 (2.)	44 (0.8)	353 (3.4)	10 (0.6)	337 (5.3)
	46 (1.0)	434 (3.0)	44 (0.7)	3 3 (3.4)	10 (0.6)	407 (4.)
	45 (0.8)	601 (4.4)	37 (0.6)	562 (4.)	18 (0.6)	553 (5.0)
	45 (1.1)	282 (8.3)	46 (1.0)	215 (5.7)	(0.4)	207 (10.2)
d	43 (1.1)	408 (6.1)	52 (0.)	35 (5.5)	5 (0.4)	334 (10.3)
	41 (1.4)	548 (5.7)	41 (0.)	50 (5.2)	1 (1.2)	48 (5.4)
	38 (1.2)	530 (3.)	48 (1.0)	500 (3.5)	14 (0.6)	4 6 (4.7)
	32 (1.1)	582 (3.3)	47 (0.8)	546 (3.6)	21 (1.0)	540 (2.)
a	28 (1.0)	616 (3.3)	38 (0.7)	560 (4.3)	34 (1.1)	548 (3.3)
	20 (0.7)	612 (2.2)	42 (0.7)	556 (2.0)	38 (0.)	533 (2.1)
	20 (0.)	5 5 (2.7)	46 (0.8)	551 (1.8)	34 (1.0)	52 (2.3)
¶	53 (1.5)	56 (4.)	32 (1.3)	525 (5.2)	15 (0.)	513 (6.3)
	48 (0.2)	4 0 (0.8)	38 (0.2)	445 (0.)	13 (0.1)	430 (1.2)
Benchmarking Participants						
	50 (1.8)	513 (3.5)	34 (1.2)	46 (3.4)	16 (1.2)	455 (4.6)
	53 (1.8)	554 (5.0)	31 (1.0)	512 (5.1)	16 (1.3)	4 5 (5.)
	52 (1.5)	553 (2.8)	34 (1.1)	517 (2.)	15 (1.0)	4 7 (4.7)
	50 (1.7)	551 (3.4)	31 (1.1)	518 (3.7)	1 (1.2)	503 (3.2)

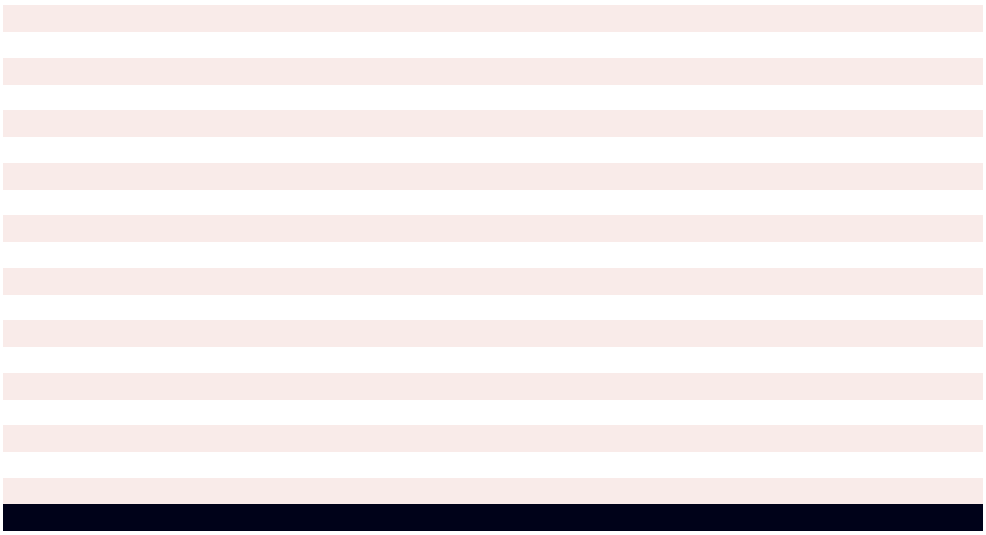
Chemistry



biology and earth science, while the Slovak Republic had the highest in chemistry and the Russian Federation in physics. Romania had the lowest percentage in the high category for earth science, chemistry, and

Index of Students' Vad [illegible] science [illegible]

General/ Integrated Science						
	85 (0.6)	37 (2.7)	13 (0.6)	315 (6.6)	2 (0.2)	
	83 (0.)	438 (3.6)	16 (0.)	384 (6.1)	1 (0.2)	
	83 (1.1)	27 (5.5)	16 (1.0)	173 (8.4)	1 (0.2)	
	83 (0.)	484 (3.3)	15 (0.8)	450 (6.)	3 (0.3)	450 (17.1)
	80 (0.)	406 (2.1)	16 (0.7)	400 (3.5)	4 (0.3)	3 6 (6.3)
	80 (0.)	448 (3.0)	17 (0.8)	3 5 (5.4)	3 (0.3)	385 (11.1)
	80 (1.3)	400 (3.0)	17 (1.2)	3 7 (4.8)	3 (0.4)	405 (11.0)
	76 (0.)	242 (6.1)	1 (0.7)	246 (11.6)	5 (0.4)	270 (16.0)
d	75 (0.)	3 0 (5.8)	22 (0.)	342 (7.2)	2 (0.2)	
	73 (1.2)	520 (3.5)	25 (1.1)	488 (4.2)	2 (0.2)	
	71 (1.1)	403 (4.1)	23 (0.8)	3 3 (4.7)	7 (0.6)	3 4 (7.)
	70 (0.)	442 (2.0)	23 (0.7)	433 (2.)	7 (0.5)	431 (4.4)
	62 (1.0)	5 (3.)	33 (0.)	551 (4.6)	6 (0.4)	505 (7.3)
	60 (1.1)	452 (2.7)	31 (0.7)	457 (2.6)	(0.5)	455 (3.7)
	53 (0.)	40 (3.6)	34 (0.7)	414 (3.1)	13 (0.6)	427 (4.0)
	4 (1.0)	528 (3.5)	33 (0.)	506 (3.8)	17 (0.)	47 (5.0)
	47 (0.8)	543 (3.6)	37 (0.6)	520 (3.2)	16 (0.6)	503 (3.8)
	42 (1.3)	4 (3.7)	32 (0.)	48 (4.1)	26 (1.1)	480 (4.7)
	40 (1.5)	535 (6.5)	40 (1.1)	517 (5.0)	21 (1.0)	502 (4.4)
	40 (0.)	574 (3.1)	51 (0.8)	54 (3.3)	(0.5)	523 (4.)
	36 (1.2)	551 (3.7)	37 (1.0)	522 (4.1)	27 (1.0)	506 (5.0)
	35 (1.2)	506 (3.4)	43 (0.8)	4 6 (2.5)	22 (1.0)	478 (2.7)
	2 (0.)	507 (4.0)	55 (0.8)	488 (3.5)	16 (0.7)	473 (4.2)
a	26 (1.0)	600 (4.5)	4 (0.8)	571 (3.6)	25 (1.0)	544 (3.8)
	1 (0.7)	600 (2.1)	55 (0.7)	55 (1.8)	26 (0.8)	52 (2.6)
	17 (0.8)	586 (3.3)	56 (0.8)	555 (1.8)	27 (1.0)	526 (2.8)
¶	38 (1.5)	562 (6.3)	41 (1.1)	544 (5.0)	22 (1.4)	522 (4.8)
	57 (0.2)	477 (0.8)	31 (0.2)	450 (1.0)	12 (0.1)	463 (1.6)
Benchmarking Participants						
	36 (1.3)	4 5 (3.5)	36 (1.0)	4 3 (3.8)	27 (1.4)	476 (3.2)
	45 (1.7)	544 (5.4)	37 (1.1)	528 (4.)	1 (1.4)	506 (4.7)
	50 (1.5)	546 (3.0)	35 (1.1)	523 (2.8)	15 (0.)	514 (4.4)
	30 (1.5)	550 (4.5)	48 (1.1)	528 (2.)	23 (1.2)	514 (3.4)



.10 Index of Students' Valuing Science (SVS) *(...Continued)*

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Countries	High		Medium		Low	
Chemistry						
	62 (1.4)	3 6 (4.3)	30 (1.1)	388 (6.2)	8 (0.6)	403 (.4)
	48 (1.4)	440 (4.6)	2 (0.)	466 (4.3)	23 (1.0)	470 (4.4)
	3 (1.3)	476 (4.0)	48 (1.0)	475 (4.2)	13 (0.8)	463 (4.7)
	38 (1.4)	464 (5.0)	35 (0.)	464 (3.8)	28 (1.2)	467 (3.6)
	35 (0.)	521 (5.4)	44 (0.8)	514 (3.4)	21 (0.)	50 (3.6)
	2 (1.6)	473 (6.5)	36 (1.1)	484 (5.3)	35 (1.7)	483 (5.5)
	2 (1.1)	516 (3.5)	47 (0.)	515 (3.0)	25 (1.1)	506 (3.6)
	27 (1.1)	524 (3.7)	42 (1.0)	51 (2.7)	31 (1.0)	515 (2.8)
	27 (0.7)	452 (3.4)	37 (0.8)	445 (2.8)	37 (0.7)	436 (3.0)
	26 (1.2)	467 (6.3)	36 (1.0)	473 (5.8)	38 (1.6)	476 (5.2)
	22 (0.)	52 (3.7)	48 (1.0)	521 (2.3)	31 (1.2)	516 (2.4)
	21 (1.0)	461 (4.6)	28 (0.8)	467 (3.5)	51 (1.4)	475 (2.7)
	21 (1.0)	511 (4.1)	41 (0.)	516 (4.0)	37 (1.3)	522 (3.4)
	17 (0.)	555 (3.)	42 (1.0)	558 (2.8)	41 (1.3)	548 (2.8)
	15 (0.)	541 (5.4)	52 (1.0)	532 (3.3)	33 (1.1)	515 (3.2)
	15 (0.8)	543 (4.8)	38 (1.1)	53 (3.5)	47 (1.3)	546 (3.1)
	2 (0.3)	4 2 (1.2)	40 (0.2)	4 2 (1.1)	31 (0.3)	4 1 (1.1)
Physics						
	57 (1.1)	401 (4.4)	33 (0.)	385 (5.7)	10 (0.7)	401 (8.4)
	56 (1.5)	413 (4.3)	41 (1.4)	432 (3.7)	3 (0.3)	440 (8.3)
	50 (1.3)	443 (4.4)	28 (0.)	465 (3.)	22 (1.2)	468 (5.2)
	48 (1.4)	468 (4.3)	34 (0.)	462 (4.0)	18 (1.1)	463 (4.1)
	40 (1.2)	474 (3.8)	4 (1.2)	475 (4.3)	11 (0.8)	465 (5.3)
	37 (0.)	522 (4.)	46 (0.8)	513 (3.6)	17 (0.7)	502 (4.1)
	35 (1.6)	481 (6.1)	38 (1.1)	480 (5.5)	27 (1.7)	481 (6.7)
	33 (0.)	457 (2.7)	38 (0.8)	440 (2.4)	2 (0.)	435 (3.3)
	31 (1.2)	518 (3.6)	46 (1.1)	515 (2.8)	23 (1.1)	505 (3.5)
	27 (1.2)	471 (7.0)	37 (1.0)	472 (5.4)	35 (1.5)	473 (5.3)
	25 (1.1)	525 (3.2)	43 (0.)	521 (2.7)	31 (1.1)	512 (2.)
	21 (1.2)	524 (4.7)	40 (1.0)	513 (3.8)	3 (1.3)	517 (3.)
	21 (0.)	464 (4.3)	2 (0.8)	46 (3.2)	50 (1.2)	472 (2.)
	1 (0.)	558 (4.4)	41 (1.1)	541 (3.2)	40 (1.4)	540 (3.4)
	18 (0.)	558 (3.8)	43 (0.)	55 (3.0)	3 (1.1)	545 (2.5)
	16 (0.)	526 (3.8)	45 (1.1)	524 (2.7)	38 (1.3)	516 (2.3)
	16 (0.)	548 (5.4)	51 (0.)	534 (2.8)	33 (1.0)	508 (3.4)
	12 (1.0)	547 (5.6)	48 (1.2)	542 (3.2)	3 (1.5)	527 (3.6)
	31 (0.3)	4 4 (1.1)	41 (0.2)	4 1 (0.)	28 (0.3)	487 (1.1)

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the relationship averaged across countries appears curvilinear, primarily because the countries with the highest percentages of students in the high index category had low average achievement, and those with the lowest percentages had high achievement.

Eighth-grade students in the separate-science countries appear to place less value on the individual sciences. Greater percentages of students were in the high index category for biology (37 percent, on average) and physics (31 percent), and lower percentages for earth science and chemistry (29 percent each). Countries with relatively large percentages of students at the high level in all subject areas included Armenia, Macedonia, Moldova, and Indonesia and Lebanon where applicable. The relationship between valuihvely lar levoa-Mries with the 50EndivY Lebal.hm

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or 1999 included Australia, Chile, Hong Kong SAR, Iran, Israel, Japan, Jordan, Korea, New Zealand, Norway-5 743.