

International Assessments

Among 15-year-old students, 29 education systems had higher average scores than the United States in mathematics literacy, 22 had higher average scores in science literacy, and 19 had higher average scores in reading literacy, according to the 2012 Program for International Student Assessment (PISA).

The Program for International Student Assessment (PISA), coordinated by the Organization for Economic Cooperation and Development (OECD), has measured the performance of 15-year-old students in mathematics, science, and reading literacy every 3 years since 2000. In 2012, PISA was administered in 65 countries and education systems, including all 34 member countries of the OECD. In addition to participating in the U.S. national sample, three states—Connecticut, Florida, and Massachusetts—opted to participate as individual

education systems and had separate samples of public schools and public-school students included in PISA to obtain state-level results. PISA 2012 results are reported by average scale score (from 0 to 1,000) as well as by the percentage of students reaching particular proficiency levels. Proficiency results are presented in terms of the percentages of students reaching proficiency level 5 or above (i.e., percentages of top performers) and the percentages of students performing below proficiency level 2 (i.e., percentages of low performers).

Table 1. Average scores of 15-year-old students on the Program for International Student Assessment (PISA) mathematics literacy scale, by education system: 2012

Education system	Average score	Education system	Average score
OECD average	494 ▲	OECD average	494 ▲
Shanghai-CHN	613 ▲	Lithuania	479
Singapore	573 ▲	Sweden	478
Hong Kong-CHN	561 ▲	Hungary	477
Chinese Taipei-CHN	560 ▲	Croatia	471 ▼
Korea, Republic of	554 ▲	Israel	466 ▼
Macao-CHN	538 ▲	Greece	453 ▼
Japan	536 ▲	Serbia, Republic of	449 ▼
Liechtenstein	535 ▲	Turkey	448 ▼
Switzerland	531 ▲	Romania	445 ▼
Netherlands	523 ▲	Cyprus	440 ▼
Estonia	521 ▲	Bulgaria	439 ▼
Finland	519 ▲	United Arab Emirates	434 ▼
Canada	518 ▲	Kazakhstan	432 ▼
Poland	518 ▲	Thailand	427 ▼
Belgium	515 ▲	Chile	423 ▼
Germany	514 ▲	Malaysia	421 ▼
Vietnam	511 ▲	Mexico	413 ▼
Austria	506 ▲	Montenegro, Republic of	410 ▼
Australia	504 ▲	Uruguay	409 ▼
Ireland	501 ▲	Costa Rica	407 ▼
Slovenia	501 ▲	Albania	394 ▼
Denmark	500 ▲	Brazil	391 ▼
New Zealand	500 ▲	Argentina	388 ▼
Czech Republic	499 ▲	Tunisia	388 ▼
France	495 ▲	Jordan	386 ▼
United Kingdom	494 ▲	Colombia	376 ▼
Iceland	493 ▲	Qatar	376 ▼
Latvia	491 ▲	Indonesia	375 ▼
Luxembourg	490 ▲	Peru	368 ▼
Norway	489		
Portugal	487		
Italy	485		
Spain	484		
Russian Federation	482		
Slovak Republic	482		
United States	481		
		U.S. state education systems	
		Massachusetts	514 ▲
		Connecticut	506 ▲
		Florida	467 ▼

▲ Average score is higher than U.S. average score.

▼ Average score is lower than U.S. average score.

NOTE: Education systems are ordered by 2012 average score. The Organization for Economic Cooperation and Development (OECD) average is the average of the national averages of the OECD member countries, with each country weighted equally. Scores are reported on a scale from 0 to 1,000. All average scores reported as higher or lower than the U.S. average score are different at the .05 level of statistical significance. Italics indicate non-OECD education systems. Results for Connecticut, Florida, and Massachusetts are for public school students only.

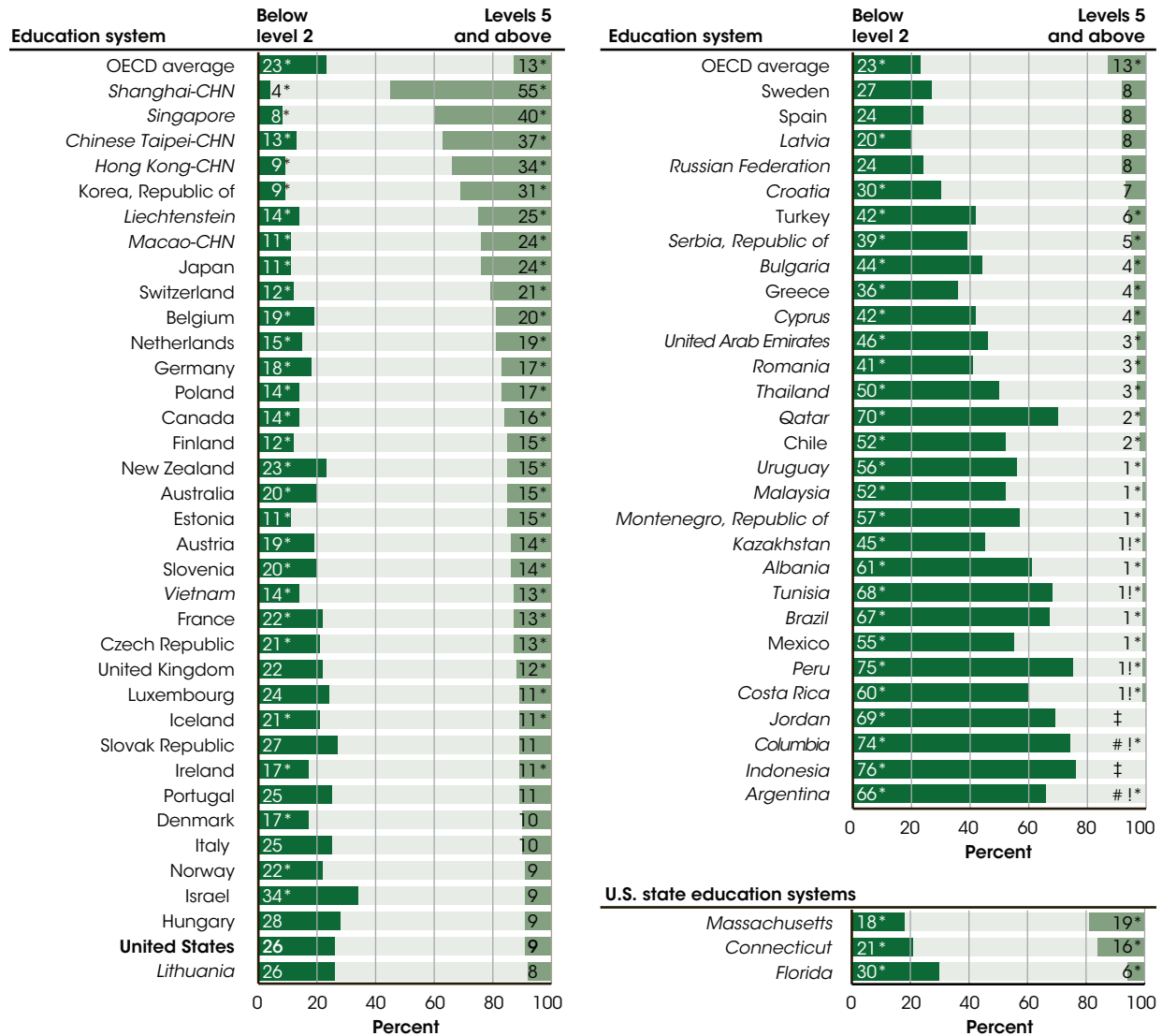
SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012. See *Digest of Education Statistics 2013*, table 602.60.

In 2012, average scores in mathematics literacy ranged from 368 in Peru to 613 in Shanghai-CHN. The U.S. average mathematics score (481) was lower than the average for all OECD countries (494). Twenty-nine education systems and two U.S. states had higher average mathematics scores than the U.S. average score and nine had scores not measurably different from the U.S. score. The 29 education systems with scores higher than the U.S. average score were Shanghai-CHN, Singapore, Hong Kong-CHN, Chinese Taipei-CHN, the Republic of Korea, Macao-CHN, Japan, Liechtenstein, Switzerland, the Netherlands, Estonia, Finland, Canada, Poland, Belgium, Germany, Vietnam, Austria, Australia, Ireland,

Slovenia, Denmark, New Zealand, the Czech Republic, France, the United Kingdom, Iceland, Latvia, and Luxembourg. Within the United States, Massachusetts (514) and Connecticut (506) had scores higher than the U.S. average.

In addition to scoring above the U.S. average, Massachusetts scored above the OECD average. Connecticut scored above the U.S. national average, but its score was not measurably different from the OECD average. Florida's average score (467) was below the U.S. national average.

Figure 1. Percentage of 15-year-old students performing on the Program for International Student Assessment (PISA) mathematics literacy scale, by selected proficiency level and education system: 2012



■ Below level 2
■ Levels 5 and above

Rounds to zero.

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

‡ Reporting standards not met. Either there are too few cases for a reliable estimate or the coefficient of variation (CV) is 50 percent or greater.

* $p < .05$. Significantly different from the U.S. percentage at the .05 level of statistical significance.

NOTE: Education systems are ordered by 2012 percentages of 15-year-olds at levels 5 and above. To reach a particular proficiency level, a student must correctly answer a majority of items at that level. Students were classified into mathematics proficiency levels according to their scores. Exact cut scores are as follows: below level 1 (a score less than or equal to 357.77); level 1 (a score greater than 357.77 and less than or equal to 420.07); level 2 (a score greater than 420.07 and less than or equal to 482.38); level 3 (a score greater than 482.38 and less than or equal to 544.68); level 4 (a score greater than 544.68 and less than or equal to 606.99); level 5 (a score greater than 606.99 and less than or equal to 669.30); and level 6 (a score greater than 669.30). Scores are reported on a scale from 0 to 1,000. The Organization for Economic Cooperation and Development (OECD) average is the average of the national percentages of the OECD member countries, with each country weighted equally. Italics indicate non-OECD education systems. Results for Connecticut, Florida, and Massachusetts are for public school students only.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012. See *Digest of Education Statistics 2013*, table 602.60.

PISA reports mathematics literacy in terms of six proficiency levels, with level 1 being the lowest and level 6 being the highest. Students scoring at proficiency levels 5 and above are considered to be top performers since they have demonstrated advanced mathematical thinking and reasoning skills required to solve problems of greater complexity. The percentage of top performers in the United States was lower than the average of the OECD countries' percentages of top performers (9 vs.

13 percent). Percentages of top performers ranged from near 0 percent in Colombia and Argentina to 55 percent in Shanghai-CHN. Twenty-seven education systems and two U.S. states had higher percentages of top performers in mathematics literacy than the United States. Massachusetts and Connecticut both had higher percentages of top performers (19 and 16 percent, respectively) than the United States (9 percent), while Florida had a lower percentage (6 percent).

A higher percentage (26 percent) of 15-year-olds in the United States scored below proficiency level 2 in mathematics literacy than the average of the OECD countries' percentages (23 percent). Percentages of low performers ranged from 4 percent in Shanghai-CHN to 76 percent in Indonesia. Twenty-nine education systems and two U.S. states had lower percentages of

low performers than the United States in mathematics literacy. The U.S. percentage of low performers was higher than the percentages for both Massachusetts (18 percent) and Connecticut (21 percent). The percentage of low performers in Florida (30 percent) was not measurably different from the U.S. percentage.

Table 2. Average scores of 15-year-old students on the Program for International Student Assessment (PISA) science literacy scale, by education system: 2012

Education system	Average score	Education system	Average score
OECD average	501	OECD average	501
<i>Shanghai-CHN</i>	580 ▲	<i>Russian Federation</i>	486 ▼
<i>Hong Kong-CHN</i>	555 ▲	Sweden	485 ▼
<i>Singapore</i>	551 ▲	Iceland	478 ▼
Japan	547 ▲	Slovak Republic	471 ▼
Finland	545 ▲	Israel	470 ▼
Estonia	541 ▲	Greece	467 ▼
Korea, Republic of	538 ▲	Turkey	463 ▼
<i>Vietnam</i>	528 ▲	<i>United Arab Emirates</i>	448 ▼
Poland	526 ▲	<i>Bulgaria</i>	446 ▼
Canada	525 ▲	Chile	445 ▼
<i>Liechtenstein</i>	525 ▲	<i>Serbia, Republic of</i>	445 ▼
Germany	524 ▲	<i>Thailand</i>	444 ▼
<i>Chinese Taipei-CHN</i>	523 ▲	<i>Romania</i>	439 ▼
Netherlands	522 ▲	<i>Cyprus</i>	438 ▼
Ireland	522 ▲	<i>Costa Rica</i>	429 ▼
Australia	521 ▲	<i>Kazakhstan</i>	425 ▼
<i>Macao-CHN</i>	521 ▲	<i>Malaysia</i>	420 ▼
New Zealand	516 ▲	<i>Uruguay</i>	416 ▼
Switzerland	515 ▲	Mexico	415 ▼
Slovenia	514 ▲	<i>Montenegro, Republic of</i>	410 ▼
United Kingdom	514 ▲	<i>Jordan</i>	409 ▼
Czech Republic	508 ▲	<i>Argentina</i>	406 ▼
Austria	506	<i>Brazil</i>	405 ▼
Belgium	505	<i>Colombia</i>	399 ▼
<i>Latvia</i>	502	<i>Tunisia</i>	398 ▼
France	499	<i>Albania</i>	397 ▼
Denmark	498	<i>Qatar</i>	384 ▼
United States	497	<i>Indonesia</i>	382 ▼
Spain	496	<i>Peru</i>	373 ▼
<i>Lithuania</i>	496		
Norway	495		
Hungary	494		
Italy	494		
<i>Croatia</i>	491		
Luxembourg	491		
Portugal	489		
		U.S. state education systems	
		<i>Massachusetts</i>	527 ▲
		<i>Connecticut</i>	521 ▲
		<i>Florida</i>	485

▲ Average score is higher than U.S. average score.

▼ Average score is lower than U.S. average score.

NOTE: Education systems are ordered by 2012 average score. The Organization for Economic Cooperation and Development (OECD) average is the average of the national averages of the OECD member countries, with each country weighted equally. Scores are reported on a scale from 0 to 1,000. All average scores reported as higher or lower than the U.S. average score are different at the .05 level of statistical significance. Italics indicate non-OECD education systems. Results for Connecticut, Florida, and Massachusetts are for public school students only.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012. See *Digest of Education Statistics 2013*, table 602.70.

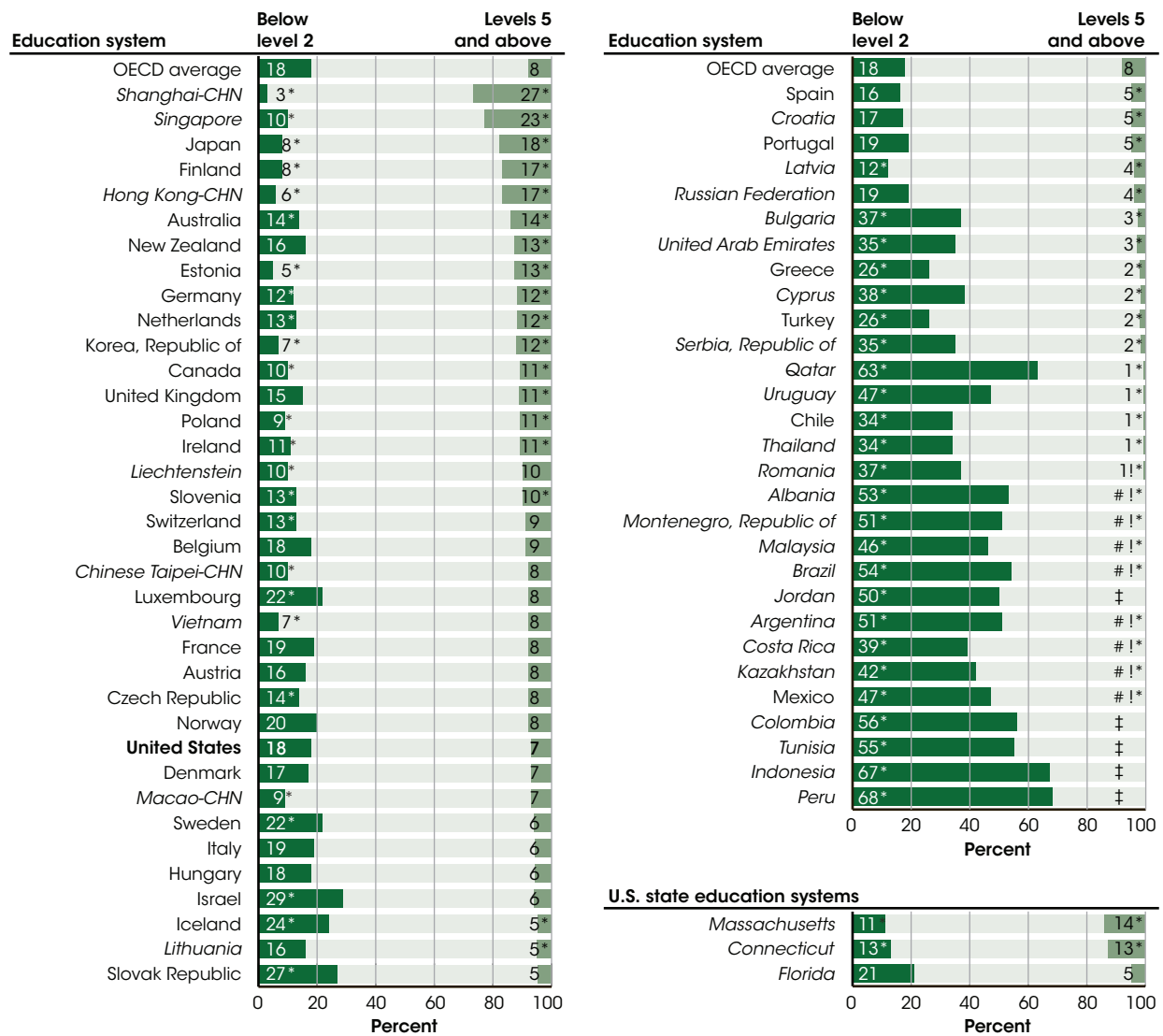
In science literacy, average scores ranged from 373 in Peru to 580 in Shanghai-CHN. The U.S. average science score (497) was not measurably different from the OECD average (501). Twenty-two education systems and 2 U.S. states had higher average science scores than the United States, and 13 systems and 1 U.S. state had scores that were not measurably different. The 22 education systems with higher scores than the U.S. average score were

Shanghai-CHN, Hong Kong-CHN, Singapore, Japan, Finland, Estonia, the Republic of Korea, Vietnam, Poland, Canada, Liechtenstein, Germany, Chinese Taipei-CHN, the Netherlands, Ireland, Australia, Macao-CHN, New Zealand, Switzerland, Slovenia, the United Kingdom, and the Czech Republic. Within the United States, Massachusetts and Connecticut scored above the U.S. average.

In addition to scoring above the U.S. national average, Massachusetts (527) and Connecticut (521) also scored above the OECD average. Florida (485) had an average

score not measurably different from the U.S. average and lower than the OECD average.

Figure 2. Percentage of 15-year-old students performing on the Program for International Student Assessment (PISA) science literacy scale, by selected proficiency level and education system: 2012



■ Below level 2
 ■ Levels 5 and above
 # Rounds to zero.

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

‡ Reporting standards not met. Either there are too few cases for a reliable estimate or the coefficient of variation (CV) is 50 percent or greater.

* $p < .05$. Significantly different from the U.S. percentage at the .05 level of statistical significance.

NOTE: Education systems are ordered by 2012 percentages of 15-year-olds at levels 5 and above. To reach a particular proficiency level, a student must correctly answer a majority of items at that level. Students were classified into science proficiency levels according to their scores. Exact cut scores are as follows: below level 1 (a score less than or equal to 334.94); level 1 (a score greater than 334.94 and less than or equal to 409.54); level 2 (a score greater than 409.54 and less than or equal to 484.14); level 3 (a score greater than 484.14 and less than or equal to 558.73); level 4 (a score greater than 558.73 and less than or equal to 633.33); level 5 (a score greater than 633.33 and less than or equal to 707.93); and level 6 (a score greater than 707.93). Scores are reported on a scale from 0 to 1,000. The Organization for Economic Cooperation and Development (OECD) average is the average of the national percentages of the OECD member countries, with each country weighted equally. Italics indicate non-OECD education systems. Results for Connecticut, Florida, and Massachusetts are for public school students only.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012. See *Digest of Education Statistics 2013*, table 602.70.

Similar to PISA’s reporting of mathematics literacy, PISA also reports science literacy by six proficiency levels, with level 1 being the lowest and level 6 being the highest. Students performing at levels 5 and 6 can apply scientific knowledge in a variety of complex life situations. The percentage of U.S. top performers on the science literacy scale (7 percent) was not measurably different from the average of the OECD countries’ percentages of top performers (8 percent). Percentages of top performers ranged from near 0 percent in eight education systems to 27 percent in Shanghai-CHN. Sixteen education systems and two U.S. states had percentages of top performers higher than the United States in science literacy. Massachusetts and Connecticut both had higher percentages of top performers (14 and 13 percent,

respectively) than the United States, while Florida had a percentage that was not measurably different (5 percent).

The percentage of U.S. students who scored below proficiency level 2 in science literacy was not measurably different from the average of the OECD countries’ percentages (both 18 percent). Percentages of low performers ranged from 3 percent in Shanghai-CHN to 68 percent in Peru. Twenty-one education systems and two U.S. states, Massachusetts and Connecticut (11 and 13 percent, respectively), had lower percentages of low performers than the United States in science literacy. The percentage of low performers for Florida (21 percent) was not measurably different from the percentage for the United States.

Table 3. Average scores of 15-year-old students on the Program for International Student Assessment (PISA) reading literacy scale, by education system: 2012

Education system	Average score	Education system	Average score
OECD average	496	OECD average	496
<i>Shanghai-CHN</i>	570 ▲	Iceland	483 ▼
<i>Hong Kong-CHN</i>	545 ▲	Slovenia	481 ▼
<i>Singapore</i>	542 ▲	<i>Lithuania</i>	477 ▼
Japan	538 ▲	Greece	477 ▼
Korea, Republic of	536 ▲	Turkey	475 ▼
Finland	524 ▲	<i>Russian Federation</i>	475 ▼
Ireland	523 ▲	Slovak Republic	463 ▼
<i>Chinese Taipei-CHN</i>	523 ▲	<i>Cyprus</i>	449 ▼
Canada	523 ▲	<i>Serbia, Republic of</i>	446 ▼
Poland	518 ▲	<i>United Arab Emirates</i>	442 ▼
Estonia	516 ▲	Chile	441 ▼
<i>Liechtenstein</i>	516 ▲	<i>Thailand</i>	441 ▼
New Zealand	512 ▲	<i>Costa Rica</i>	441 ▼
Australia	512 ▲	<i>Romania</i>	438 ▼
Netherlands	511 ▲	<i>Bulgaria</i>	436 ▼
Switzerland	509 ▲	Mexico	424 ▼
<i>Macao-CHN</i>	509 ▲	<i>Montenegro, Republic of</i>	422 ▼
Belgium	509 ▲	<i>Uruguay</i>	411 ▼
<i>Vietnam</i>	508	<i>Brazil</i>	410 ▼
Germany	508 ▲	<i>Tunisia</i>	404 ▼
France	505	<i>Colombia</i>	403 ▼
Norway	504	<i>Jordan</i>	399 ▼
United Kingdom	499	<i>Malaysia</i>	398 ▼
United States	498	<i>Indonesia</i>	396 ▼
Denmark	496	<i>Argentina</i>	396 ▼
Czech Republic	493	<i>Albania</i>	394 ▼
Italy	490	<i>Kazakhstan</i>	393 ▼
Austria	490	<i>Qatar</i>	388 ▼
<i>Latvia</i>	489 ▼	<i>Peru</i>	384 ▼
Hungary	488		
Spain	488 ▼		
Luxembourg	488 ▼		
Portugal	488		
Israel	486		
<i>Croatia</i>	485 ▼		
Sweden	483 ▼		
		U.S. state education systems	
		<i>Massachusetts</i>	527 ▲
		<i>Connecticut</i>	521 ▲
		<i>Florida</i>	492

▲ Average score is higher than U.S. average score.

▼ Average score is lower than U.S. average score.

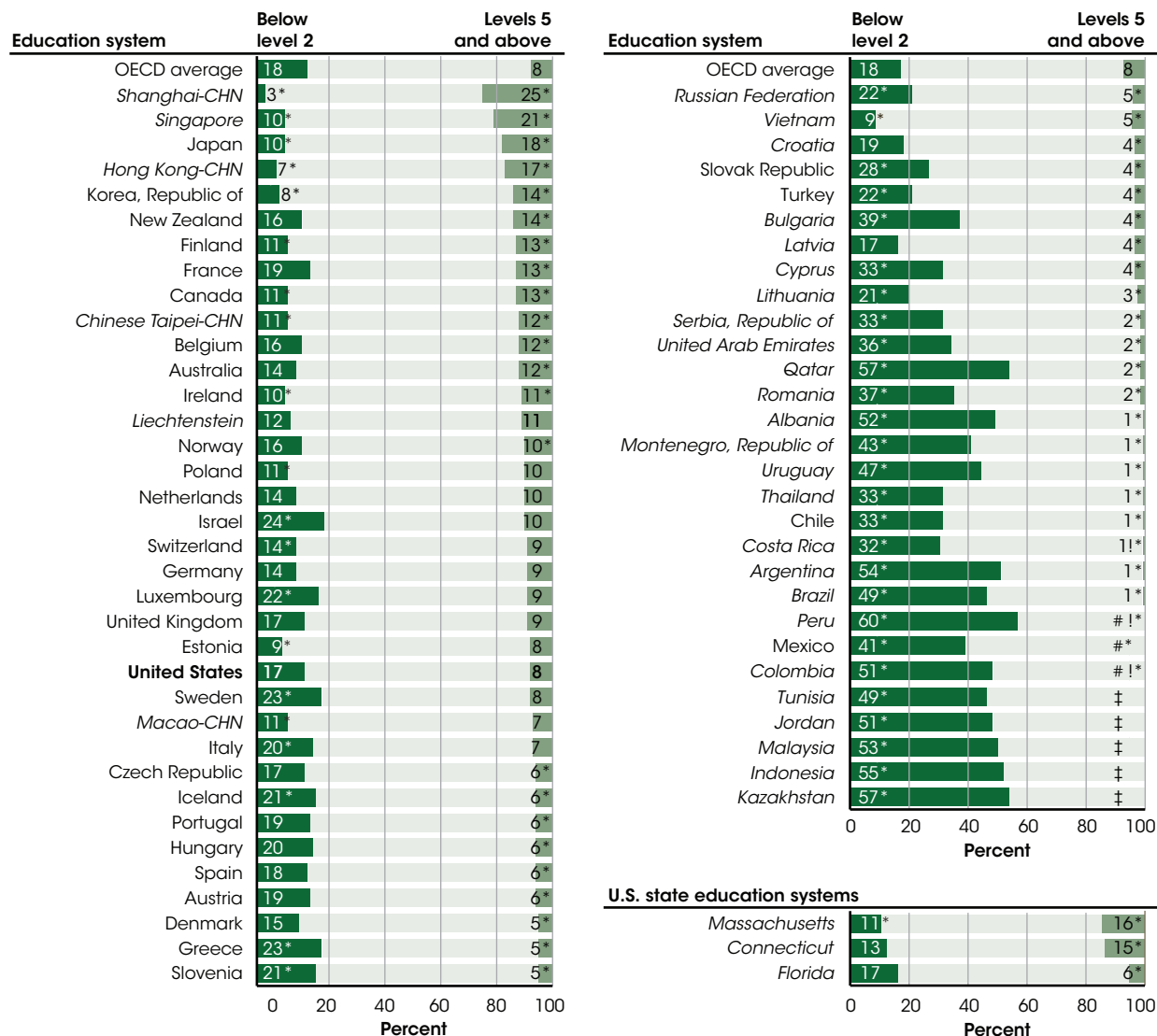
NOTE: Education systems are ordered by 2012 average score. The Organization for Economic Cooperation and Development (OECD) average is the average of the national averages of the OECD member countries, with each country weighted equally. Scores are reported on a scale from 0 to 1,000. All average scores reported as higher or lower than the U.S. average score are different at the .05 level of statistical significance. Italics indicate non-OECD education systems. Results for Connecticut, Florida, and Massachusetts are for public school students only.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012. See *Digest of Education Statistics 2013*, table 602.50.

In reading literacy, average scores ranged from 384 in Peru to 570 in Shanghai-CHN. The U.S. average score (498) was not measurably different from the OECD average (496). Nineteen education systems and 2 U.S. states had higher average reading scores and 11 education systems and 1 U.S. state had scores that were not measurably different. The 19 education systems with higher average scores than the United States in reading literacy were

Shanghai-CHN, Hong Kong-CHN, Singapore, Japan, the Republic of Korea, Finland, Ireland, Chinese Taipei-CHN, Canada, Poland, Estonia, Liechtenstein, New Zealand, Australia, the Netherlands, Switzerland, Macao-CHN, Belgium, and Germany. Within the United States, Massachusetts and Connecticut, scored above the U.S. average.

Figure 3. Percentage of 15-year-old students performing on the Program for International Student Assessment (PISA) reading literacy scale, by selected proficiency level and education system: 2012



■ Below level 2
■ Levels 5 and above
Rounds to zero.

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

‡ Reporting standards not met. Either there are too few cases for a reliable estimate or the coefficient of variation (CV) is 50 percent or greater.

* $p < .05$. Significantly different from the U.S. percentage at the .05 level of statistical significance.

NOTE: Education systems are ordered by 2012 percentages of 15-year-olds at levels 5 and above. To reach a particular proficiency level, a student must correctly answer a majority of items at that level. Students were classified into reading proficiency levels according to their scores. Exact cut scores are as follows: below level 1b (a score less than or equal to 262.04); level 1b (a score greater than 262.04 and less than or equal to 334.75); level 1a (a score greater than 334.75 and less than or equal to 407.47); level 2 (a score greater than 407.47 and less than or equal to 480.18); level 3 (a score greater than 480.18 and less than or equal to 552.98); level 4 (a score greater than 552.98 and less than or equal to 625.61); level 5 (a score greater than 625.61 and less than or equal to 698.32); and level 6 (a score greater than 698.32). Scores are reported on a scale from 0 to 1,000. The Organization for Economic Cooperation and Development (OECD) average is the average of the national percentages of the OECD member countries, with each country weighted equally. Italics indicate non-OECD education systems. Results for Connecticut, Florida, and Massachusetts are for public school students only.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012. See *Digest of Education Statistics 2013*, table 602.50.

In reading, Massachusetts (527) and Connecticut (521) scored above both the U.S. national average and the OECD average. Florida had an average reading score (492) that was not measurably different from either the U.S. average or the OECD average.

PISA reports reading literacy by seven proficiency levels, with level 1b being the lowest and level 6 being the highest. At levels 5 and 6, students have mastered sophisticated reading skills required to interpret and evaluate deeply embedded or abstract text. The percentage of U.S. top performers on the reading literacy scale was not measurably different from the average of the OECD countries' percentages of top performers (both 8 percent). Percentages of top performers ranged from near 0 percent in three education systems to 25 percent in Shanghai-CHN. Fourteen education systems and two U.S. states had percentages of top performers higher than the United States in reading literacy. Massachusetts and Connecticut both had higher percentages of top performers (16 and 15 percent, respectively) than the United States, while Florida had a lower percentage (6 percent).

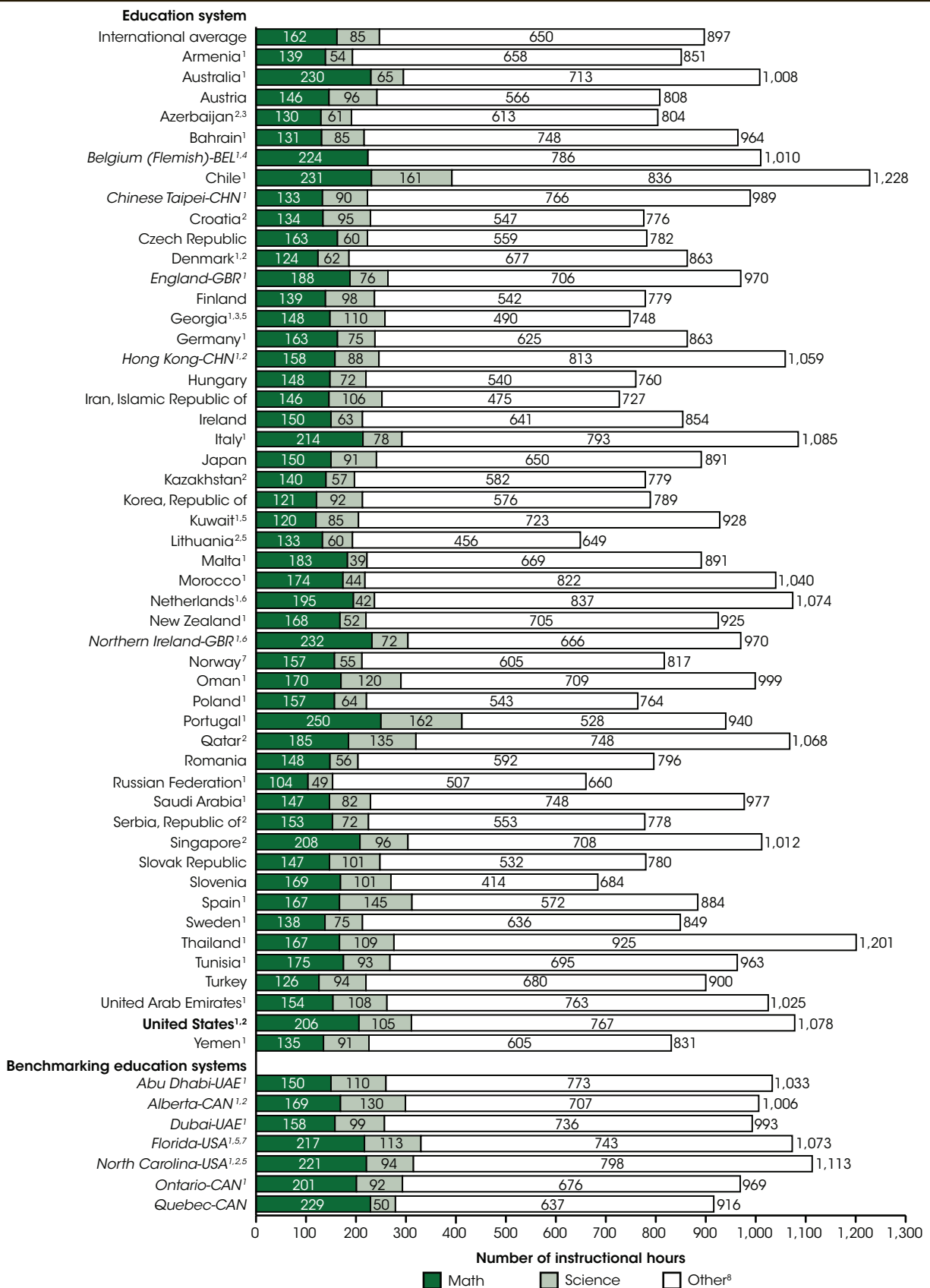
The percentage of U.S. students who were low performers in reading literacy was not measurably different from the average of the OECD countries' percentages of low performers (17 and 18 percent, respectively). Percentages of low performers ranged from 3 percent in Shanghai-CHN to 60 percent in Peru. Fourteen education systems and one U.S. state had lower percentages of low performers than the United States in reading literacy. Massachusetts had a lower percentage (11 percent) than the United States, while Connecticut and Florida both

had percentages that were not measurably different (13 and 17 percent, respectively).

The United States also participates in the Trends in International Mathematics and Science Study (TIMSS) and the Progress in International Reading Literacy Study (PIRLS). Both assessments are coordinated by the TIMSS & PIRLS International Study Center at Boston College, under the auspices of the International Association for the Evaluation of Educational Achievement (IEA), an international organization of national research institutions and governmental research agencies. TIMSS assesses mathematics and science knowledge and skills at grades 4 and 8, and PIRLS assesses reading literacy at grade 4.

In 2011, there were 57 education systems that had TIMSS mathematics and science data at grade 4 and 56 education systems that had these data at grade 8. Education systems include countries (complete, independent, and political entities) and other benchmarking education systems (portions of a country, nation, kingdom, or emirate, or other non-national entities). These benchmarking systems are able to participate in TIMSS even though they may not be members of the IEA. Participating allows them the opportunity to assess their students' achievement and to view their curricula in an international context. In addition to participating in the U.S. national sample, several U.S. states participated individually and are included as education systems. At the 4th-grade level, two U.S. states (Florida and North Carolina) participated; at the 8th-grade level, nine U.S. states (Alabama, California, Colorado, Connecticut, Florida, Indiana, Massachusetts, Minnesota, and North Carolina) participated.

Figure 4. Number of instructional hours per year for 4th-grade students, by country or education system and subject: 2011



See notes on next page.

¹ Data for number of math, science, and/or total instructional hours are available for at least 50 percent but less than 85 percent of students.

² National Defined Population covers 90 to 95 percent of National Target Population defined by TIMSS.

³ Exclusion rates for Azerbaijan and Georgia are slightly underestimated as some conflict zones were not covered and no official statistics were available.

⁴ Data for instructional hours in science are not available. Other instructional hours calculated by subtracting instruction hours in mathematics from total instructional hours.

⁵ National Target Population does not include all of the International Target Population defined by TIMSS.

⁶ Met guidelines for sample participation rates only after replacement schools were included.

⁷ National Defined Population covers less than 90 percent, but at least 77 percent, of National Target Population defined by TIMSS.

⁸ Other instructional hours calculated by adding instructional hours in mathematics to instructional hours in science and then subtracting from total instructional hours.

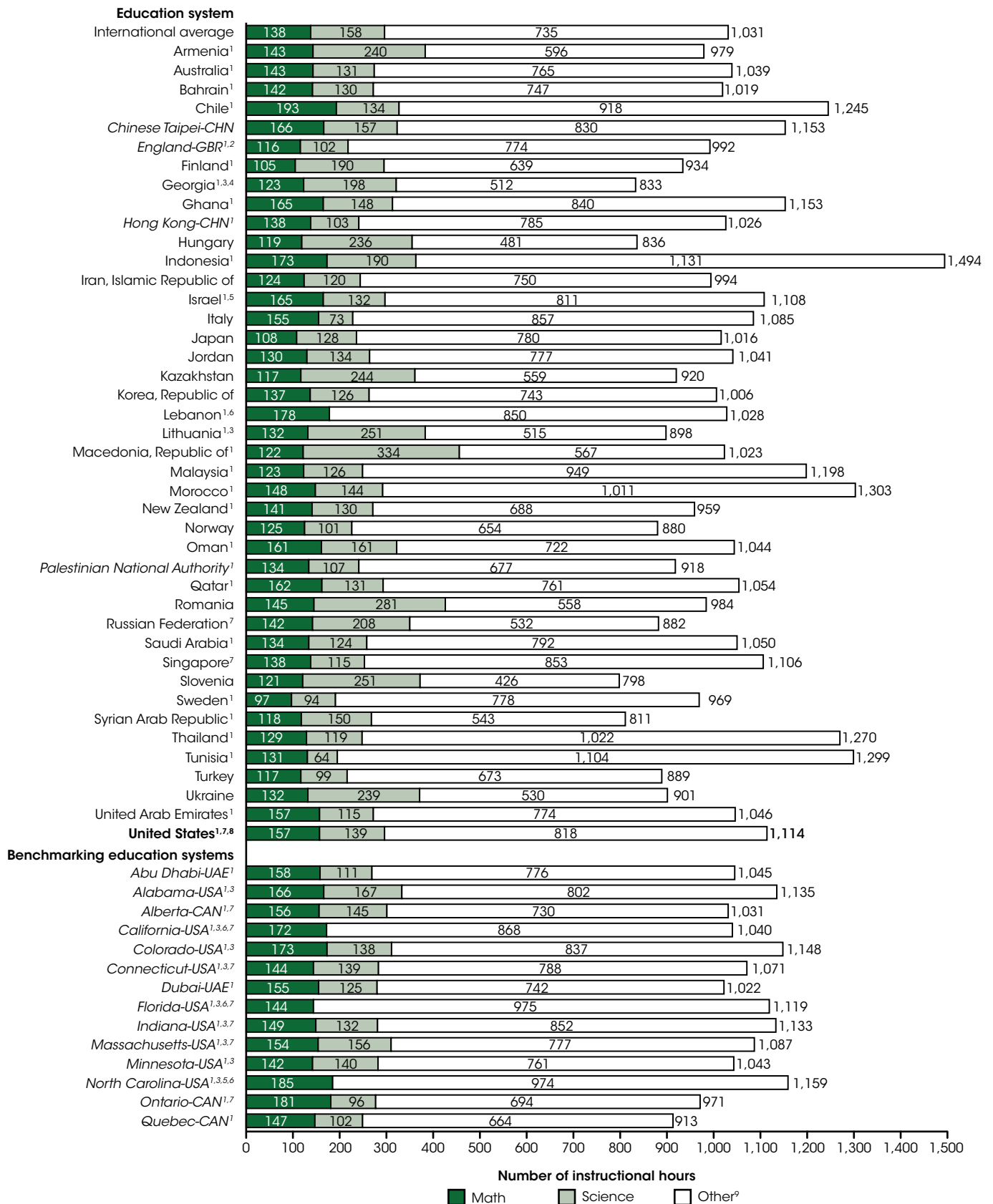
NOTE: Italics indicate participants identified and counted in this report as an education system and not as a separate country. Instructional times shown in this table are actual or implemented times (as opposed to intended times prescribed by the curriculum). Principals reported total instructional hours per day and school days per year. Total instructional hours per year were calculated by multiplying the number of school days per year by the number of instructional hours per day. Teachers reported instructional hours per week in mathematics and science. Instructional hours per year in mathematics and science were calculated by dividing weekly instructional hours by the number of school days per week and then multiplying by the number of school days per year. International average instructional hours includes only education systems that are members of the International Association for the Evaluation of Educational Achievement (IAE), which develops and implements TIMSS at the international level. "Benchmarking" education systems are not members of the IEA and are therefore not included in the average. All U.S. state data are based on public school students only.

SOURCE: Mullis, I.V.S., Martin, M.O., Foy, P., and Arora, A. (2012). *TIMSS 2011 International Results in Mathematics*, exhibit 8.6, and Martin, M.O., Mullis, I.V.S., Foy, P., and Stanco, G.M. (2012). *TIMSS 2011 International Results in Science*, exhibit 8.6. See *Digest of Education Statistics 2013*, table 602.20.

In addition to assessing achievement in mathematics and science, TIMSS collects information from principals on the total number of annual instructional hours in school. TIMSS also collects information from teachers on the number of annual instructional hours spent on mathematics and science instruction at grades 4 and 8. In 2011, education systems (excluding the benchmarking participants) participating in TIMSS at grade 4 spent an average of 897 total hours on instructional time, of which an average of 162 hours (18 percent) were spent on

mathematics instruction and 85 hours (9 percent) were spent on science instruction. In 2011, the average number of total instructional hours (1,078 hours) spent in the United States at grade 4 was higher than the international average (897 hours). The average numbers of instructional hours spent on grade 4 mathematics instruction (206 hours) and science instruction (105 hours) in the United States were also higher than the international averages (162 and 85 hours, respectively).

Figure 5. Number of instructional hours per year for 8th-grade students, by country or education system and subject: 2011



See notes on next page.

¹ Data for number of math and/or science instructional hours are available for at least 50 percent but less than 85 percent of students.

² Nearly satisfied guidelines for sample participation rate after replacement schools were included.

³ Target Population does not include all of the International Target Population defined by TIMSS.

⁴ Exclusion rates for Georgia are slightly underestimated as some conflict zones were not covered and no official statistics were available.

⁵ National Defined Population covers less than 90 percent, but at least 77 percent, of National Target Population defined by TIMSS.

⁶ Data for instructional hours in science were not available. Other instructional hours calculated by subtracting instruction hours in mathematics from total instructional hours.

⁷ National Defined Population covers 90 to 95 percent of National Target Population defined by TIMSS.

⁸ Data for science are for 2007 and are from TIMSS 2007 International Results in Science. Met guidelines for sample participation rates only after substitute schools were included. Data for number of math instructional hours are available for at least 50 percent but less than 70 percent of students.

⁹ Other instructional hours calculated by adding instructional hours in mathematics to instructional hours in science and then subtracting from total instructional hours.

NOTE: Instructional times shown in this table are actual or implemented times (as opposed to intended times prescribed by the curriculum). Principals reported total instructional hours per day and school days per year. Total instructional hours per year were calculated by multiplying the number of school days per year by the number of instructional hours per day. Teachers reported instructional hours per week in mathematics and science. Instructional hours per year in mathematics and science were calculated by dividing weekly instructional hours by the number of school days per week and then multiplying by the number of school days per year. International average instructional hours includes only education systems that are members of the International Association for the Evaluation of Educational Achievement (IEA), which develops and implements TIMSS at the international level. "Benchmarking" education systems are not members of the IEA and are therefore not included in the average. All U.S. state data are based on public school students only.

SOURCE: Mullis, I.V.S., Martin, M.O., Foy, P., and Arora, A. (2012). *TIMSS 2011 International Results in Mathematics*, exhibit 8.7, and Martin, M.O., Mullis, I.V.S., Foy, P., and Stanco, G.M. (2012). *TIMSS 2011 International Results in Science*, exhibit 8.7. See *Digest of Education Statistics 2013*, table 602.30.

At grade 8, education systems (excluding the benchmarking participants) participating in TIMSS spent an average of 1,031 total annual hours on instructional time in 2011, of which 138 hours (13 percent) were spent on mathematics instruction and 158 hours (15 percent) were spent on science instruction. Similar to the findings

at grade 4, the United States' average number of total instructional hours at grade 8 (1,114 hours) was higher than the international average (1,031 hours). The average hours spent on grade 8 mathematics instruction (157 hours) in the United States was also higher than the international average (138 hours).

Table 8. Average PIRLS reading literacy assessment scale scores of 4th-grade students, by education system: 2011

Education system	Overall reading average scale score	Education system	Overall reading average scale score
PIRLS scale average	500	PIRLS scale average	500
<i>Hong Kong-CHN</i> ¹	571 ▲	France	520 ▼
Russian Federation	568 ▲	Spain	513 ▼
Finland	568 ▲	Norway ⁵	507 ▼
Singapore ²	567 ▲	<i>Belgium (French)-BEL</i> ^{2,3}	506 ▼
<i>Northern Ireland-GBR</i> ³	558	Romania	502 ▼
United States²	556	Georgia ^{4,6}	488 ▼
Denmark ²	554	Malta	477 ▼
Croatia ²	553	Trinidad and Tobago	471 ▼
<i>Chinese Taipei-CHN</i>	553	Azerbaijan ^{2,6}	462 ▼
Ireland	552	Iran, Islamic Republic of	457 ▼
<i>England-GBR</i> ³	552	Colombia	448 ▼
Canada ²	548 ▼	United Arab Emirates	439 ▼
Netherlands ³	546 ▼	Saudi Arabia	430 ▼
Czech Republic	545 ▼	Indonesia	428 ▼
Sweden	542 ▼	Qatar ²	425 ▼
Italy	541 ▼	Oman ⁷	391 ▼
Germany	541 ▼	Morocco ⁸	310 ▼
Israel ¹	541 ▼		
Portugal	541 ▼		
Hungary	539 ▼		
Slovak Republic	535 ▼	Benchmarking education systems	
Bulgaria	532 ▼	<i>Florida-USA</i> ^{1,4}	569 ▲
New Zealand	531 ▼	<i>Ontario-CAN</i> ²	552
Slovenia	530 ▼	<i>Alberta-CAN</i> ²	548 ▼
Austria	529 ▼	<i>Quebec-CAN</i>	538 ▼
Lithuania ^{2,4}	528 ▼	<i>Andalusia-ESP</i>	515 ▼
Australia	527 ▼	<i>Dubai-UAE</i>	476 ▼
Poland	526 ▼	<i>Maltese-MLT</i>	457 ▼
		<i>Abu Dhabi-UAE</i>	424 ▼

▲ Average score is higher than U.S. average score.

▼ Average score is lower than U.S. average score.

¹ National Defined Population covers less than 90 percent of National Target Population defined by PIRLS.

² National Defined Population covers 90 percent to 95 percent of National Target Population defined by PIRLS.

³ Met guidelines for sample participation rates only after replacement schools were included.

⁴ National Target Population does not include all of the International Target Population defined by PIRLS.

⁵ Nearly satisfied guidelines for sample participation rates after replacement schools were included.

⁶ Exclusion rates for Azerbaijan and Georgia are slightly underestimated as some conflict zones were not covered and no official statistics were available.

⁷ The PIRLS International Study Center has reservations about the reliability of the average achievement score because the percentage of students with achievement too low for estimation exceeds 15 percent, though it is less than 25 percent.

⁸ The PIRLS International Study Center has reservations about the reliability of the average achievement score because the percentage of students with achievement too low for estimation exceeds 25 percent.

NOTE: Education systems are ordered by 2011 average score. Italics indicate participants identified and counted in this report as an education system and not as a separate country. The Progress in International Reading Literacy Study (PIRLS) scores are reported on a scale from 0 to 1,000, with the scale average set at 500 and the standard deviation set at 100. The PIRLS average includes only education systems that are members of the International Association for the Evaluation of Educational Achievement (IEA), which develops and implements PIRLS at the international level. "Benchmarking" education systems are not members of the IEA and are therefore not included in the average. All U.S. state data are based on public school students only.

SOURCE: Thompson, S., Provasnik, S., Kastberg, D., Ferraro, D., Lemanski, N., Roey, S., and Jenkins, F. (2012). *Highlights From PIRLS 2011: Reading Achievement of U.S. Fourth-Grade Students in an International Context* (NCES 2013-010), table 3, data from the International Association for the Evaluation of Educational Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011. See *Digest of Education Statistics 2013*, table 602.10.

In 2011, there were 53 education systems that had PIRLS reading literacy data at grade 4. These 53 education systems included both countries and other benchmarking education systems. In addition to participating in the U.S. national sample, Florida participated individually and was included as an education system. In 2011, the U.S. average 4th-grade reading literacy score (556) was higher than the PIRLS scale average (500). The United States was among the top 13 education systems in reading literacy (5 education systems had higher average scores, and 7 had scores that were not measurably different).

The United States scored higher, on average, than 40 education systems.

The five education systems with average reading scores above the U.S. score were Finland, Hong Kong-CHN, the Russian Federation, Singapore, and, within the United States, Florida. Additionally, Florida's average score (569) was higher than the PIRLS scale average. No education system scored higher than Florida, although four had scores that were not measurably different. Forty-eight education systems scored lower than Florida.

Reference tables: *Digest of Education Statistics 2013*, tables 602.10, 602.20, 602.30, 602.50, 602.60, and 602.70

Related indicators: Educational Attainment of Young Adults, International Educational Attainment, U.S. Student and Adult Performance on International Assessments of Educational Achievement [*The Condition of Education 2006 Special Analysis*], U.S. Performance Across International Assessments of Student Achievement [*The Condition of Education 2009 Special Analysis*]

Glossary: Organization for Economic Cooperation and Development (OECD)