

International Comparisons: Science, Reading, and Mathematics Literacy of 15-Year-Old Students

In 2015, there were 18 education systems with higher average science literacy scores for 15-year-olds than the United States, 14 with higher reading literacy scores, and 36 with higher mathematics literacy scores.

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 science, reading, and mathematics literacy every 3 years since 2000. In 2015, PISA was administered in 73¹ countries and education systems,² including all 35 member countries of the OECD. In addition to participating in the U.S. national sample, Massachusetts and North Carolina participated individually as states. Puerto Rico also participated in the PISA assessment, but was not included in the U.S. national results. The samples of schools and students for all education systems and Puerto Rico

included both public and private schools, while the samples of schools and students for Massachusetts and North Carolina were from public schools only.

PISA 2015 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 and above (i.e., percentages of top performers) and the percentages of students performing below proficiency level 2. Proficiency level 2 is considered a baseline of proficiency by the OECD (i.e., percentages of low performers).

Table 1. Average scores of 15-year-old students on the Program for International Student Assessment (PISA) science literacy scale, by education system: 2015

Education system	Average score	Education system	Average score
OECD average	493	Iceland	473 ▼
<i>Singapore</i>	556 ▲	Israel	467 ▼
Japan	538 ▲	<i>Malta</i>	465 ▼
Estonia	534 ▲	Slovak Republic	461 ▼
<i>Chinese Taipei</i>	532 ▲	Greece	455 ▼
Finland	531 ▲	Chile	447 ▼
<i>Macau (China)</i>	529 ▲	<i>Bulgaria</i>	446 ▼
Canada	528 ▲	<i>United Arab Emirates</i>	437 ▼
<i>Vietnam</i>	525 ▲	<i>Uruguay</i>	435 ▼
<i>Hong Kong (China)</i>	523 ▲	<i>Romania</i>	435 ▼
<i>B-S-J-G (China)¹</i>	518 ▲	<i>Cyprus</i>	433 ▼
Korea, Republic of	516 ▲	<i>Moldova, Republic of</i>	428 ▼
New Zealand	513 ▲	<i>Albania</i>	427 ▼
Slovenia	513 ▲	Turkey	425 ▼
Australia	510 ▲	<i>Trinidad and Tobago</i>	425 ▼
United Kingdom	509 ▲	<i>Thailand</i>	421 ▼
German	509 ▲	<i>Costa Rica</i>	420 ▼
Netherlands	509 ▲	<i>Qatar</i>	418 ▼
Switzerland	506 ▲	<i>Colombia</i>	416 ▼
Ireland	503	Mexico	416 ▼
Belgium	502	<i>Montenegro, Republic of</i>	411 ▼
Denmark	502	<i>Georgia</i>	411 ▼
Poland	501	<i>Jordan</i>	409 ▼
Portugal	501	<i>Indonesia</i>	403 ▼
Norway	498	<i>Brazil</i>	401 ▼
United States	496	<i>Peru</i>	397 ▼
Austria	495	<i>Lebanon</i>	386 ▼
France	495	<i>Tunisia</i>	386 ▼
Sweden	493	<i>Macedonia, Republic of</i>	384 ▼
Czech Republic	493	<i>Kosovo</i>	378 ▼
Spain	493	<i>Algeria</i>	376 ▼
Latvia	490	<i>Dominican Republic</i>	332 ▼
<i>Russian Federation</i>	487 ▼		
Luxembourg	483 ▼		
Italy	481 ▼		
Hungary	477 ▼		
<i>Lithuania</i>	475 ▼		
<i>Croatia</i>	475 ▼		
<i>Buenos Aires (Argentina)</i>	475 ▼		
		U.S. states and territories	
		<i>Massachusetts</i>	529 ▲
		<i>North Carolina</i>	502
		<i>Puerto Rico</i>	403 ▼

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

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

¹ *B-S-J-G (China)* refers to the four PISA participating China provinces: Beijing, Shanghai, Jiangsu, and Guangdong.

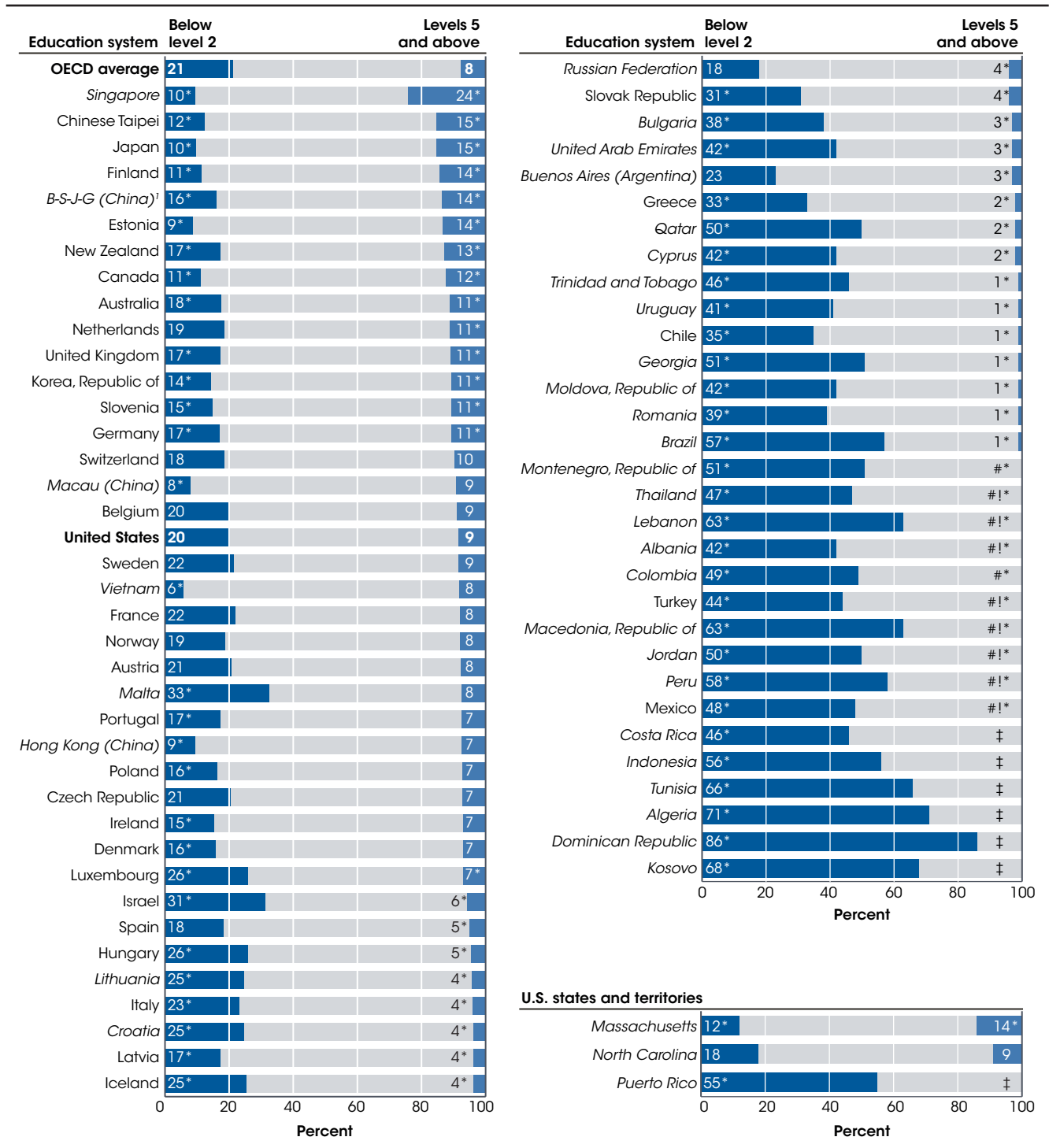
NOTE: Education systems are ordered by 2015 average score. The OECD average is the average of the national averages of the OECD member countries, with each country weighted equally. Scores are reported on a scale from 0 to 1,000. All average scores reported as higher or lower than the U.S. average score are different at a .05 level of statistical significance. Italics indicate non-OECD countries and education systems. Results for Massachusetts and North Carolina are for public school students only. Although Argentina, Kazakhstan, and Malaysia participated in PISA 2015, technical problems with their samples prevent results from being discussed in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2015. See *Digest of Education Statistics 2016*, table 602.70.

In 2015, average science literacy scores ranged from 332 in the Dominican Republic to 556 in Singapore. The U.S. average science score (496) was not measurably different from the OECD average (493). Eighteen education systems and Massachusetts had higher average science scores than the United States, and 12 systems and North Carolina had scores that were not measurably different

from the U.S. average score. Massachusetts's average score (529) was higher than both the U.S. and OECD averages, North Carolina's average score (502) was not measurably different from the U.S. and OECD averages, and Puerto Rico's average score (403) was lower than both the U.S. and OECD averages.

Figure 1. Percentage of 15-year-old students performing on the Program for International Student Assessment (PISA) science literacy scale, by selected proficiency levels and education system: 2015



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. The coefficient of variation (CV) for this estimate is 50 percent or greater.

* $p < .05$. Significantly different from the U.S. percentage.

¹ *B-S-J-G (China)* refers to the four PISA participating China provinces: Beijing, Shanghai, Jiangsu, and Guangdong.

NOTE: Education systems are ordered by percentage of 15-year-olds in levels 5 and above. To reach a particular proficiency level, students must correctly answer a majority of items at that level. Students were classified into science proficiency levels according to their scores. Cut scores for each proficiency level can be found in table A-1 available at <http://nces.ed.gov/surveys/pisa/PISA2015/index.asp>. The OECD average is the average of the national percentages of the OECD member countries, with each country weighted equally. Italics indicate non-OECD countries and education systems. Results for Massachusetts and North Carolina are for public school students only. Although Argentina, Kazakhstan, and Malaysia participated in PISA 2015, technical problems with their samples prevent results from being discussed in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2015. See *Digest of Education Statistics 2016*, table 602.70.

PISA reports science literacy in terms of seven proficiency levels, with level 1b 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 real-life situations. The percentage of U.S. top performers on the science literacy scale (9 percent) was not measurably different from the OECD average (8 percent). Percentages of top performers ranged from near 0 percent in 10 education systems to 24 percent in Singapore. Fourteen education systems and Massachusetts (14 percent) had percentages of top performers higher than the United States in science literacy, while North Carolina had a percentage that was not measurably different (9 percent) than the United States.

The percentage of U.S. students who scored below proficiency level 2 in science literacy (20 percent) was not measurably different from the OECD average (21 percent). Percentages of low performers ranged from 6 percent in Vietnam to 86 percent in the Dominican Republic. Twenty-one education systems and Massachusetts (12 percent) had lower percentages of low performers in science literacy than the United States. The percentage of low performers in North Carolina (18 percent) was not measurably different from the U.S. percentage, while the percentage in Puerto Rico (55 percent) was higher.

Table 2. Average scores of 15-year-old students on the Program for International Student Assessment (PISA) reading literacy scale, by education system: 2015

Education system	Average score	Education system	Average score
OECD average	493	<i>Lithuania</i>	472 ▼
<i>Singapore</i>	535 ▲	Hungary	470 ▼
<i>Hong Kong (China)</i>	527 ▲	Greece	467 ▼
Canada	527 ▲	Chile	459 ▼
Finland	526 ▲	Slovak Republic	453 ▼
Ireland	521 ▲	<i>Malta</i>	447 ▼
Estonia	519 ▲	<i>Cyprus</i>	443 ▼
Korea, Republic of	517 ▲	<i>Uruguay</i>	437 ▼
Japan	516 ▲	<i>Romania</i>	434 ▼
Norway	513 ▲	<i>United Arab Emirates</i>	434 ▼
New Zealand	509 ▲	<i>Bulgaria</i>	432 ▼
Germany	509 ▲	Turkey	428 ▼
<i>Macau (China)</i>	509 ▲	<i>Costa Rica</i>	427 ▼
Poland	506 ▲	<i>Trinidad and Tobago</i>	427 ▼
Slovenia	505 ▲	<i>Montenegro, Republic of</i>	427 ▼
Netherlands	503	<i>Colombia</i>	425 ▼
Australia	503	Mexico	423 ▼
Sweden	500	<i>Moldova, Republic of</i>	416 ▼
Denmark	500	<i>Thailand</i>	409 ▼
France	499	<i>Jordan</i>	408 ▼
Belgium	499	<i>Brazil</i>	407 ▼
Portugal	498	<i>Albania</i>	405 ▼
United Kingdom	498	<i>Qatar</i>	402 ▼
<i>Chinese Taipei</i>	497	<i>George</i>	401 ▼
United States	497	<i>Peru</i>	398 ▼
Spain	496	<i>Indonesia</i>	397 ▼
<i>Russian Federation</i>	495	<i>Tunisia</i>	361 ▼
<i>B-S-J-G (China)</i> ¹	494	<i>Dominican Republic</i>	358 ▼
Switzerland	492	<i>Macedonia, Republic of</i>	352 ▼
Latvia	488 ▼	<i>Algeria</i>	350 ▼
Czech Republic	487 ▼	<i>Kosovo</i>	347 ▼
<i>Croatia</i>	487 ▼	<i>Lebanon</i>	347 ▼
<i>Vietnam</i>	487 ▼		
Austria	485 ▼		
Italy	485 ▼		
Iceland	482 ▼		
Luxembourg	481 ▼		
Israel	479 ▼		
<i>Buenos Aires (Argentina)</i>	475 ▼		
		U.S. states and territories	
		<i>Massachusetts</i>	527 ▲
		<i>North Carolina</i>	500
		<i>Puerto Rico</i>	410 ▼

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

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

¹ B-S-J-G (China) refers to the four PISA participating China provinces: Beijing, Shanghai, Jiangsu, and Guangdong.

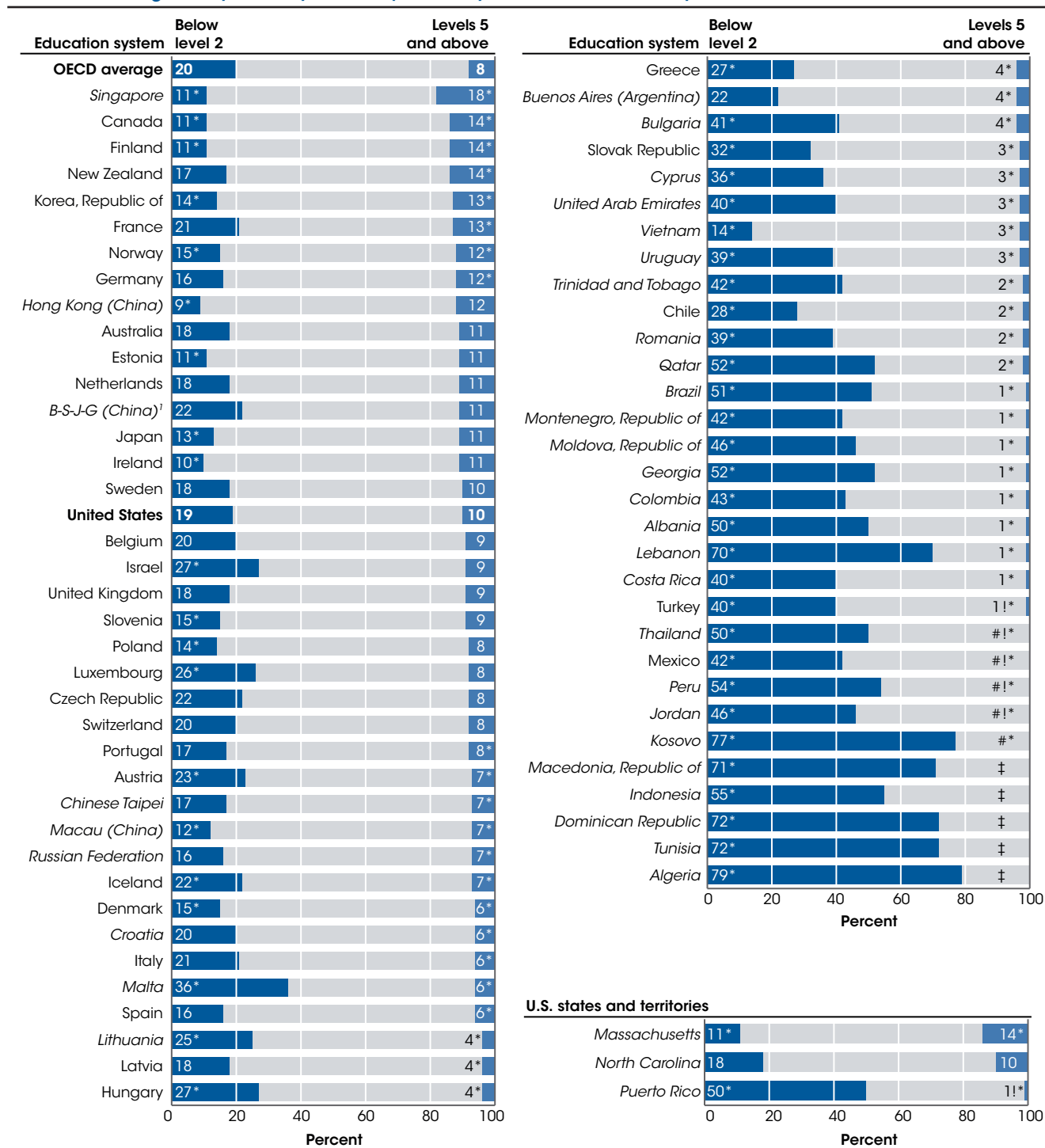
NOTE: Education systems are ordered by 2015 average score. The OECD average is the average of the national averages of the OECD member countries, with each country weighted equally. Scores are reported on a scale from 0 to 1,000. All average scores reported as higher or lower than the U.S. average score are different at a .05 level of statistical significance. Italics indicate non-OECD countries and education systems. Results for Massachusetts and North Carolina are for public school students only. Although Argentina, Kazakhstan, and Malaysia participated in PISA 2015, technical problems with their samples prevent results from being discussed in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2015. See *Digest of Education Statistics 2016*, table 602.50.

In reading literacy, average scores ranged from 347 in Lebanon to 535 in Singapore. The U.S. average score (497) was not measurably different from the OECD average (493). Fourteen education systems had higher average reading scores than the United States, and 13 education

systems had scores that were not measurably different from the U.S. score. Massachusetts's average score (527) was higher than the U.S. average, North Carolina's (500) was not measurably different, and Puerto Rico's (410) was lower.

Figure 2. Percentage of 15-year-old students performing on the Program for International Student Assessment (PISA) reading literacy scale, by selected proficiency levels and education system: 2015



■ 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. The coefficient of variation (CV) for this estimate is 50 percent or greater.

* $p < .05$. Significantly different from the U.S. percentage.

¹ B-S-J-G (China) refers to the four PISA participating China provinces: Beijing, Shanghai, Jiangsu, and Guangdong.

NOTE: Education systems are ordered by percentage of 15-year-olds in levels 5 and above. To reach a particular proficiency level, students must correctly answer a majority of items at that level. Students were classified into science proficiency levels according to their scores. Cut scores for each proficiency level can be found in table A-1 available at <http://nces.ed.gov/surveys/pisa/PISA2015/index.asp>. The OECD average is the average of the national percentages of the OECD member countries, with each country weighted equally. Italics indicate non-OECD countries and education systems. Results for Massachusetts and North Carolina are for public school students only. Although Argentina, Kazakhstan, and Malaysia participated in PISA 2015, technical problems with their samples prevent results from being discussed in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2015. See *Digest of Education Statistics 2016*, table 602.50.

As with science literacy, 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 (levels 5 and above) on the reading literacy scale (10 percent) was not measurably different from the OECD average (8 percent). Percentages of top performers ranged from near 0 percent in five education systems to 18 percent in Singapore. Eight education systems had higher percentages of top performers in reading literacy than the United States. Massachusetts had a higher percentage of top performers (14 percent) than the United States, North Carolina had a

percentage (10 percent) that was not measurably different, and Puerto Rico had a lower percentage (1 percent).

The percentage of U.S. students who were low performers in reading literacy (19 percent) was not measurably different from the OECD average (20 percent). Percentages of low performers ranged from 9 percent in Hong Kong (China) to 79 percent in Algeria. Fourteen education systems had lower percentages of low performers in reading literacy than the United States. Massachusetts had a lower percentage (11 percent) than the United States, North Carolina had a percentage that was not measurably different (18 percent), and Puerto Rico had a higher percentage (50 percent).

Table 3. Average scores of 15-year-old students on the Program for International Student Assessment (PISA) mathematics literacy scale, by education system: 2015

Education system	Average score	Education system	Average score
OECD average	490 ▲	Israel	470
<i>Singapore</i>	564 ▲	United States	470
<i>Hong Kong (China)</i>	548 ▲	<i>Croatia</i>	464
<i>Macau (China)</i>	544 ▲	<i>Buenos Aires (Argentina)</i>	456
<i>Chinese Taipei</i>	542 ▲	Greece	454 ▼
Japan	532 ▲	<i>Romania</i>	444 ▼
<i>B-S-J-G (China)¹</i>	531 ▲	<i>Bulgaria</i>	441 ▼
Korea, Republic of	524 ▲	<i>Cyprus</i>	437 ▼
Switzerland	521 ▲	<i>United Arab Emirates</i>	427 ▼
Estonia	520 ▲	Chile	423 ▼
Canada	516 ▲	Turkey	420 ▼
Netherlands	512 ▲	<i>Moldova, Republic of</i>	420 ▼
Denmark	511 ▲	<i>Uruguay</i>	418 ▼
Finland	511 ▲	<i>Montenegro, Republic of</i>	418 ▼
Slovenia	510 ▲	<i>Trinidad and Tobago</i>	417 ▼
Belgium	507 ▲	<i>Thailand</i>	415 ▼
Germany	506 ▲	<i>Albania</i>	413 ▼
Poland	504 ▲	Mexico	408 ▼
Ireland	504 ▲	<i>Georgia</i>	404 ▼
Norway	502 ▲	<i>Qatar</i>	402 ▼
Austria	497 ▲	<i>Costa Rica</i>	400 ▼
New Zealand	495 ▲	<i>Lebanon</i>	396 ▼
<i>Vietnam</i>	495 ▲	<i>Colombia</i>	390 ▼
<i>Russian Federation</i>	494 ▲	<i>Peru</i>	387 ▼
Sweden	494 ▲	<i>Indonesia</i>	386 ▼
Australia	494 ▲	<i>Jordan</i>	380 ▼
France	493 ▲	<i>Brazil</i>	377 ▼
United Kingdom	492 ▲	<i>Macedonia, Republic of</i>	371 ▼
Czech Republic	492 ▲	<i>Tunisia</i>	367 ▼
Portugal	492 ▲	<i>Kosovo</i>	362 ▼
Italy	490 ▲	<i>Algeria</i>	360 ▼
Iceland	488 ▲	<i>Dominican Republic</i>	328 ▼
Spain	486 ▲		
Luxembourg	486 ▲	U.S. states and territories	
Latvia	482 ▲	<i>Massachusetts</i>	500 ▲
<i>Malta</i>	479 ▲	<i>North Carolina</i>	471
<i>Lithuania</i>	478 ▲	<i>Puerto Rico</i>	378 ▼
Hungary	477		
Slovak Republic	475		

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

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

¹ *B-S-J-G (China)* refers to the four PISA participating China provinces: Beijing, Shanghai, Jiangsu, and Guangdong.

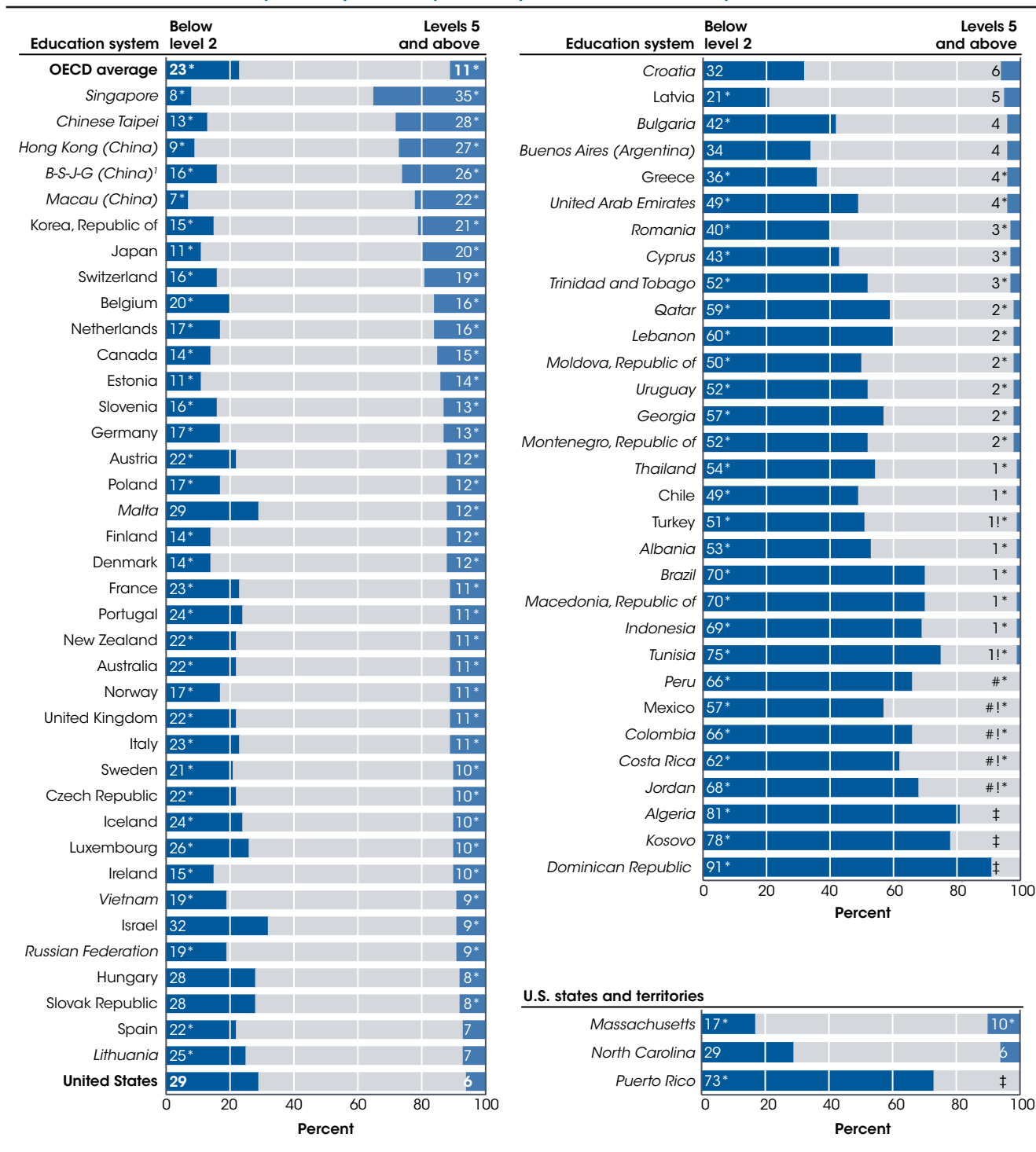
NOTE: Education systems are ordered by 2015 average score. The OECD average is the average of the national averages of the OECD member countries, with each country weighted equally. Scores are reported on a scale from 0 to 1,000. All average scores reported as higher or lower than the U.S. average score are different at a .05 level of statistical significance. Italics indicate non-OECD countries and education systems. Results for Massachusetts and North Carolina are for public school students only. Although Argentina, Kazakhstan, and Malaysia participated in PISA 2015, technical problems with their samples prevent results from being discussed in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2015. See *Digest of Education Statistics 2016*, table 602.60.

Average scores in mathematics literacy in 2015 ranged from 328 in the Dominican Republic to 564 in Singapore. The U.S. average mathematics score (470) was lower than the OECD average (490). Thirty-six education systems had higher average mathematics scores than the United

States, and five had scores not measurably different from the U.S. average. Massachusetts's average score (500) was higher than the U.S. average, North Carolina's (471) was not measurably different, and Puerto Rico's (378) was lower.

Figure 3. Percentage of 15-year-old students performing on the Program for International Student Assessment (PISA) mathematics literacy scale, by selected proficiency levels and education system: 2015



■ 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. The coefficient of variation (CV) for this estimate is 50 percent or greater.

* $p < .05$. Significantly different from the U.S. percentage.

¹ B-S-J-G (China) refers to the four PISA participating China provinces: Beijing, Shanghai, Jiangsu, and Guangdong.

NOTE: Education systems are ordered by percentage of 15-year-olds in levels 5 and above. To reach a particular proficiency level, students must correctly answer a majority of items at that level. Students were classified into mathematics proficiency levels according to their scores. Cut scores for each proficiency level can be found in table A-1 at <https://nces.ed.gov/surveys/pisa/PISA2015/index.asp>. The OECD average is the average of the national percentages of the OECD member countries, with each country weighted equally. Italics indicate non-OECD countries and education systems. Results for Massachusetts and North Carolina are for public school students only. Although Argentina, Kazakhstan, and Malaysia participated in PISA 2015, technical problems with their samples prevent results from being discussed in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2015. See *Digest of Education Statistics 2016*, 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 (6 percent) was lower than the OECD average (11 percent). Percentages of top performers ranged from near 0 percent in five education systems to 35 percent in Singapore. Thirty-six education systems and Massachusetts (10 percent) had higher percentages of top performers in mathematics literacy than the United States. North Carolina had a percentage of top performers (6 percent) not measurably different from the U.S. percentage.

The percentage of 15-year-olds in the United States who score below proficiency level 2 in mathematics literacy (29 percent) was higher than the OECD average (23 percent). Percentages of low performers ranged from 7 percent in Macau (China) to 91 percent in the Dominican Republic. Thirty-five education systems and Massachusetts (17 percent) had lower percentages of low performers in mathematics literacy than the United States. The percentage of low performers in North Carolina (29 percent) was not measurably different from the U.S. percentage, while the percentage in Puerto Rico (73 percent) was higher.

Endnotes:

¹ Although Argentina, Kazakhstan, and Malaysia participated in PISA 2015, technical problems with their samples prevent results from being discussed; therefore, results are presented for 70 education systems.

² For the purposes of this indicator, “education systems” refers to all entities participating in PISA, including countries as well as subnational entities (e.g., cities or provinces). Massachusetts, North Carolina, and Puerto Rico are treated separately in this indicator and are not included in counts of education systems.

Reference tables: *Digest of Education Statistics 2016*, tables 602.50, 602.60, and 602.70

Related indicators and resources: [International Comparisons: Reading Literacy at Grade 4](#); [International Comparisons: U.S. 4th-, 8th-, and 12th-Graders’ Mathematics and Science Achievement](#); [Mathematics Performance](#); [Reading Performance](#); [Science Performance](#)

Glossary: Organization for Economic Cooperation and Development (OECD)