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 73[1] 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).

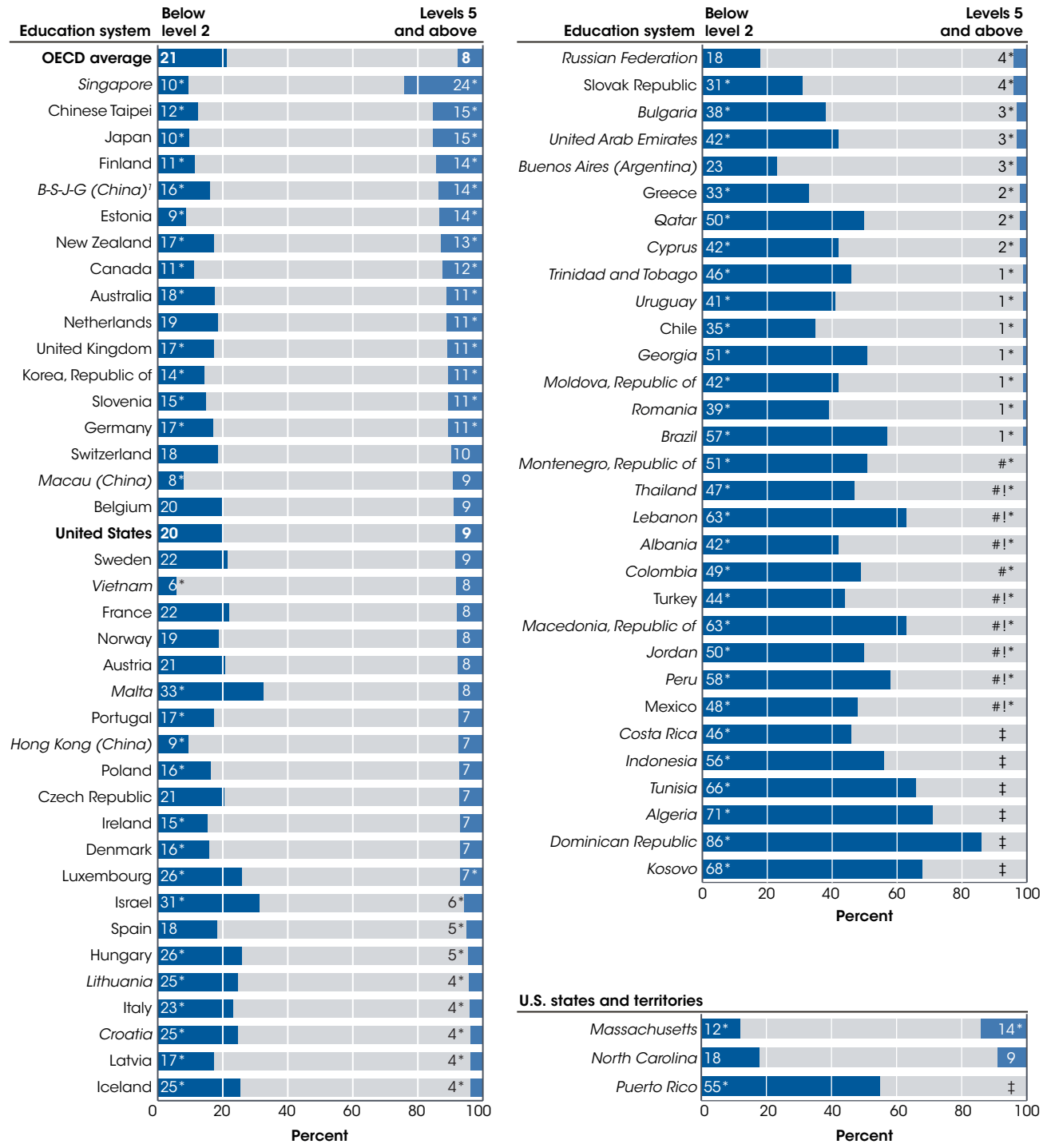
Table 1. Average scores of 15-year-old students on the Program for International Student Assessment (PISA) science literacy scale, by education system: 2015

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

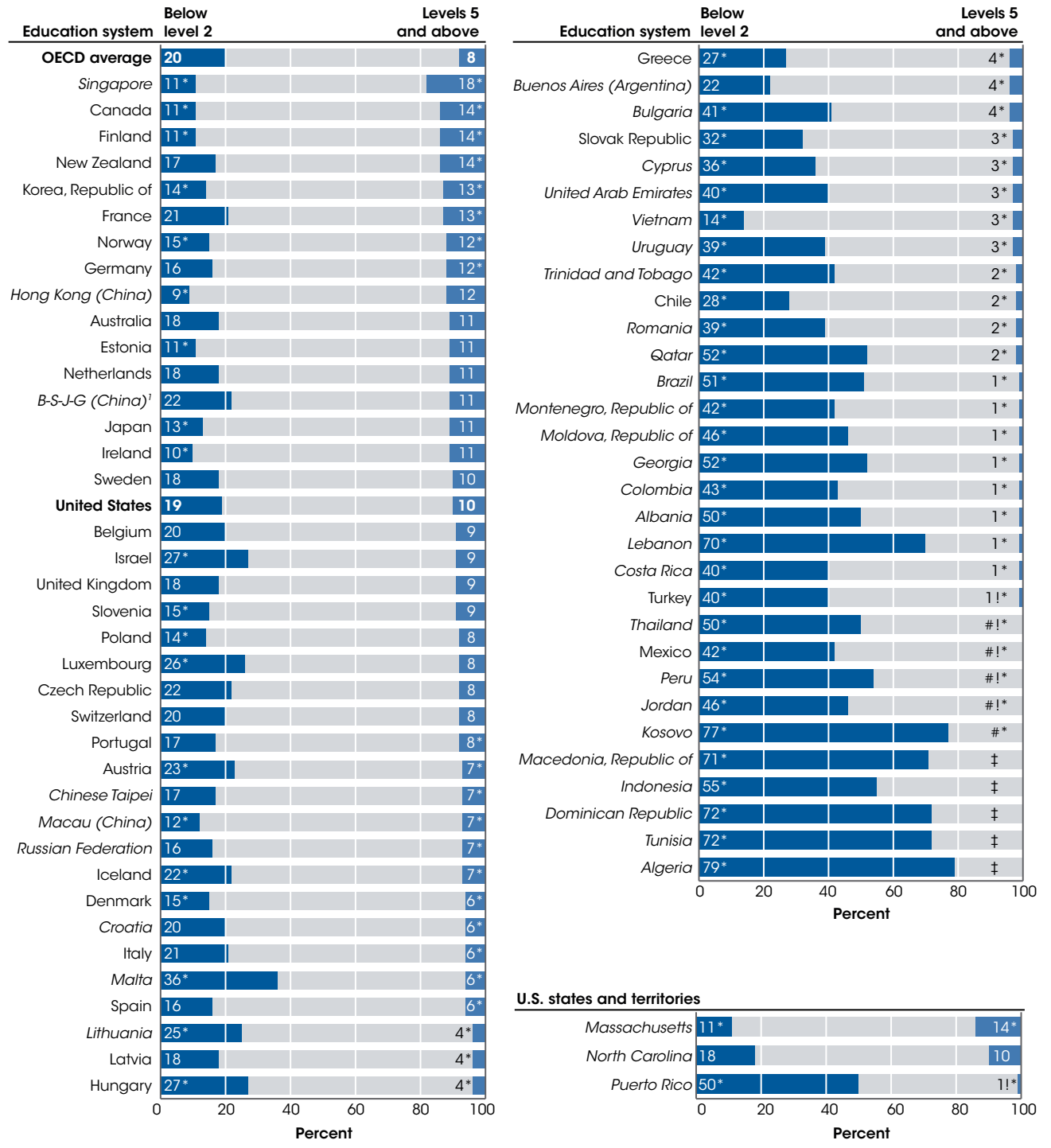
Table 2. Average scores of 15-year-old students on the Program for International Student Assessment (PISA) reading literacy scale, by education system: 2015

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

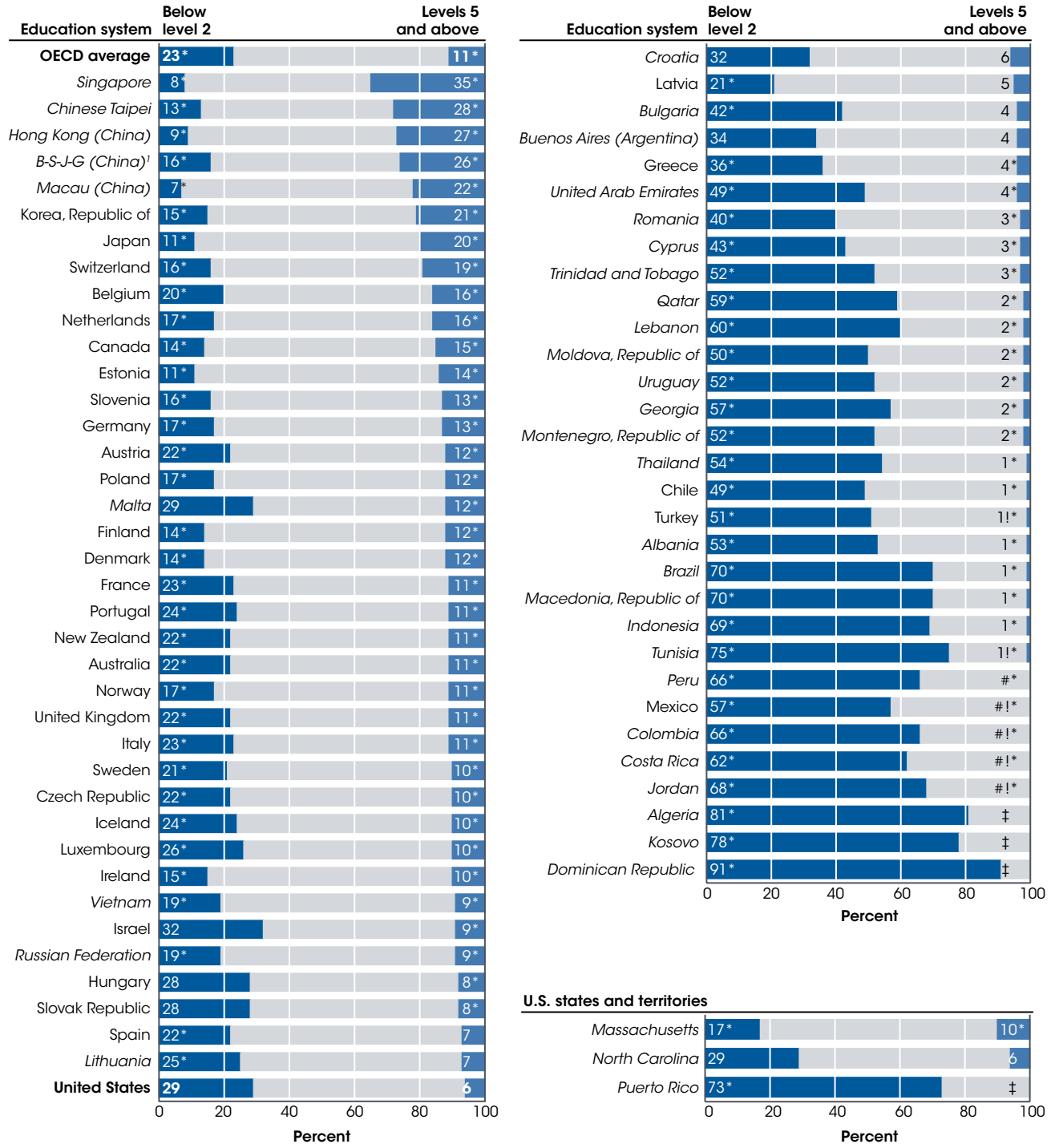
Table 3. Average scores of 15-year-old students on the Program for International Student Assessment (PISA) mathematics literacy scale, by education system: 2015

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

▲ 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)