

Low-Performing Students: Percentage of U.S. Students at the Lowest Proficiency Levels Relative to International Peers on the Most Recent International Assessments in Reading, Mathematics, and Science: Results from PIRLS 2006, TIMSS 2007, and PISA 2009

How does the United States compare with other nations in terms of the proportion of students performing at the lowest proficiency levels? The international assessments Progress in International Reading Literacy Study (PIRLS), Trends in International Mathematics and Science Study (TIMSS), and Program for International Student Assessment (PISA) report the percentage of students in each participating nation and sub-national or non-national education system performing at each of several proficiency levels. The most recent U.S. results on international assessments are from PIRLS 2006, TIMSS 2007, and PISA 2009 and cover reading, mathematics, and science literacy.

NCES used the International Data Explorer to compare the percentage of low-performing students in the United States and other participating nations (and sub-national or non-national education systems) in reading, mathematics, and science at grades 4 and 8 and age 15. Low-performing students at grades 4 and 8 are defined as those failing to reach the Low International Benchmark on the PIRLS (reading) or TIMSS (mathematics and science) assessments. At age 15, they are defined as those failing to reach PISA Proficiency Level 2. For more information about proficiency levels for each international assessment, see About This Analysis.

Results:

At grade 4, nine education systems had less than 5 percent of students performing at the lowest proficiency levels in any subject, including Chinese Taipei, Hong Kong-China, Japan, Latvia, Massachusetts, Minnesota, the Netherlands, Quebec-Canada, and Singapore (though Japan, Massachusetts, and Minnesota did not participate in grade 4 reading).

>The United States had around 5 percent low-performing students in each subject at grade 4: 4 percent in reading, 5 percent in mathematics, and 6 percent in science.

> Six out of the 45 education systems had at least 40 percent of low-performing 4th graders in reading, and 8 out of the 43 participating education systems had at least 40 percent low-performing 4th graders across both mathematics and science.

At grade 8, the Republic of Korea, Japan, and Minnesota all had less than 5 percent low-performing students in both mathematics and science (reading was not assessed internationally at grade 8).

>In both mathematics and science, 8 percent of U.S. 8th graders were low performers.

>Eleven of the 56 education systems had at least 40 percent of low-performing 8th graders across both mathematics and science.

At age 15, only Shanghai-China had 5 percent or less of low-performing students in any subject.

>About one in five U.S. 15-year-olds were low performers in reading (18 percent), mathematics (23 percent), and science (18 percent).

>Nineteen of the 65 participating education systems had at least 40 percent low-performing 15-year-olds in all three subjects and 23 had at least 40 percent low-performing 15-year-olds in at least one subject.

In both reading and mathematics, the United States had three times the percentage of low-performing 15-year-olds as it did low-performing 4th graders; in science, the United States had twice the percentage of low-performing 15-year-olds as it did low-performing 4th graders.



About the NCES International Data Explorer

This analysis was produced using the NCES International Data Explorer, a web-based data tool that allows users to quickly and easily produce tables, charts, and maps comparing the performance and educational contexts of students in the United States and nations (and sub-national or non-national education systems) around the world. The International Data Explorer is available at: <http://nces.ed.gov/surveys/international/IDE>.

About This Analysis

This analysis compares participating education systems (in most cases nations, but in some cases sub-national or non-national entities) with the international average in terms of the percentage of students scoring at the lowest proficiency levels on PIRLS, TIMSS, and PISA.

>For reading at grade 4 and mathematics and science at grades 4 and 8, the lowest proficiency level is defined as those failing to reach the TIMSS and PIRLS Low International Benchmark (a score of 400 where the mean is 500 and standard deviation (s.d.) is 100). The International Average is the average of all participating education systems.

>For reading, mathematics, and science at age 15, the lowest proficiency level is defined as those failing to reach PISA level 2 (in reading, the threshold score is 407, where the mean is 493 and the s.d. is 100; in mathematics, the threshold score is 420, where the mean is 496 and the s.d. is 100; and in science, the threshold score is 409, where the mean is 501 and the s.d. is 100). The OECD Average is the average of OECD (Organization for Economic Cooperation and Development) countries, which is a group of 34 industrialized countries.

Descriptions of the knowledge and skills associated with the PIRLS, TIMSS, and PISA proficiency levels are available in the PIRLS International Benchmarks (<http://nces.ed.gov/pubs2008/2008017.pdf>) (reading grade 4 on page 4), the TIMSS International Benchmarks (<http://nces.ed.gov/pubs2009/2009001.pdf>) (mathematics grades 4 and 8 on page 13; science grades 4 and 8 on page 38), and the PISA Proficiency Levels (<http://nces.ed.gov/pubs2011/2011004.pdf>) (reading at age 15 on page 10, mathematics at age 15 on page 19, and science at age 15 on page 25).

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About the Data Sources

The Progress in International Reading Literacy Study (PIRLS): is an international comparative study of the reading literacy of fourth-grade students. The most recent PIRLS data are from 2006, when 45 education systems participated. For more information on PIRLS, please visit: <http://nces.ed.gov/surveys/PIRLS>.

The Trends in International Mathematics and Science Study (TIMSS): is an international comparative study of the mathematics and science achievement of fourth- and eighth-grade students. The most recent TIMSS data are from 2007, when 36 education systems and 7 benchmarking jurisdictions participated at grade 4 and 48 education systems and 8 benchmarking jurisdictions participated at grade 8. For more information on TIMSS, please visit: <http://nces.ed.gov/TIMSS>.

The Program for International Student Assessment (PISA): is an international comparative study of the capabilities of 15-year-old students in mathematics, reading, and science literacy. The most recent PISA data are from 2009, when 65 education systems participated. For more information on PISA, please visit: <http://nces.ed.gov/surveys/PISA>.

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READING

Percent of low-performing students

Grade 4 (PIRLS 2006)

Age 15 (PISA 2009)

Percent of low-performing students	Grade 4 (PIRLS 2006)	Age 15 (PISA 2009)
Less than 5	Netherlands, Belgium-Fl., Hong Kong-Ch., Alberta-Ca. (1) Luxembourg, Lithuania (1), Br. Columbia-Ca., Russian Fed. (2) Latvia, Italy, Sweden, Ontario-Ca., Austria (2) Hungary, Germany, Quebec-Ca., Ch. Taipei, Singapore (3) Denmark (3), USA , France, Nova Scotia-Ca. (4)	Shanghai-Ch. (4)
5 to 9.9	Bulgaria (5) Slovenia, Slovak Rep., Spain (6) England-UK, Iceland, Scotland-UK, Poland (7) Belgium-Fr., New Zealand, Norway (8) Rep. of Moldova (9)	Rep. of Korea (6) Finland, Hong Kong-Ch. (8)
10 to 14.9		Canada (10) Singapore (12) Estonia (13) Japan, Australia, Netherlands, New Zealand (14)
15 to 19.9	Israel, Int'l Avg. (15) Romania (16) Georgia (18)	Macao-Ch., Norway, Poland, Denmark (15) Ch. Taipei (16), Switzerland, Iceland (17) Liechtenstein (16), Ireland, Sweden (17) Hungary, Latvia, USA , Portugal, Belgium (18) United Kingdom, Germany (18), OECD Avg. (19)
20 to 24.9		Spain, France (20) Greece, Italy, Slovenia (21) Slovak Rep., Croatia (22) Czech Rep. (23) Lithuania (24)
25 to 29.9		Turkey (25) Luxembourg (26) Israel, Russian Fed. (27) Austria (28)
30 to 34.9		Chile, Dubai-UAE (31) Rep. of Serbia (33)
35 to 39.9	Trinidad and Tobago (36)	
40 or higher	Islamic Rep. of Iran (40) Indonesia (46) Qatar (67) Kuwait (72), Morocco (74) South Africa (78)	Mexico, Romania (40) Bulgaria (41), Uruguay (42), Thailand (43) Trinidad and Tobago (45), Colombia (47) Jordan (48), Rep. of Montenegro, Brazil, Tunisia (50) Argentina (52), Indonesia (53), Albania (57), Kazakhstan (59) Qatar (63) Peru, Panama (65) Azerbaijan (73) Kyrgyz Rep. (83)

■ = Below the Int'l Avg./OECD Avg. □ = Not measurably different from the Int'l Avg./OECD Avg. ■ = Above the Int'l Avg./OECD Avg.

NOTE: Countries are listed by the percentage of students performing at the lowest proficiency levels (percentages in parentheses): below the *PIRLS Low International Benchmark* (400) for grade 4 and *PISA Proficiency Level 2* (407) for age 15. Education systems within the same percentage categories are ordered according to their unrounded value. International (Int'l)/OECD average scores and U.S. percentages are presented in bold font. Statistical significance (compared to the Int'l Avg./OECD Avg.) based on unrounded estimates. While the formulation and construction of assessment scales are the same across the TIMSS, PIRLS, and PISA, the content represented by the scale scores and proficiency levels is not the same across different ages within a subject domain.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Progress in International Reading Literacy Study (PIRLS) 2006; Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA) 2009.

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MATHEMATICS

Percent of low-performing students

	Grade 4 (TIMSS 2007)	Grade 8 (TIMSS 2007)	Age 15 (PISA 2009)
Less than 5	Hong Kong-Ch. (0) MA-USA , Ch. Taipei (1) Singapore, Netherlands, Japan (2) Latvia, MN-USA (3) Germany, Quebec-Ca. (4)	Rep. of Korea (2) Quebec-Ca., Japan, Singapore, MN-USA (3)	
5 to 9.9	Denmark, USA , Russian Fed. (5) Kazakhstan (5), Lithuania (6) England-UK, Alberta-Ca., Ontario-Ca. (6) Sweden, Austria, Br. Columbia-Ca. (7) Slovenia (8), Australia, Italy (9)	MA-USA , Ch. Taipei, Ontario-Ca. (5) Hong Kong-Ch. (6) Br. Columbia-Ca. (7), Basque Country-Sp. (8) Slovenia, Czech Rep., USA (8) Hungary, Russian Fed. (9)	Shanghai-Ch. (5) Finland, Rep. of Korea (8) Hong Kong-Ch., Liechtenstein (9)
10 to 14.9	Hungary, Czech Rep., Slovak Rep. (12) Scotland-UK (12) Armenia (13)	Lithuania, England-UK, Sweden (10) Australia (11) Armenia (12)	Singapore (10) Macao-Ch. (11) Canada (12) Japan, Estonia, Ch. Taipei, Netherlands (13) Switzerland (14)
15 to 19.9	New Zealand (15) Norway (17)	Scotland-UK, Norway, Italy (15) Rep. of Serbia, Malta (17) Malaysia (18)	New Zealand (15) Australia (16) Iceland, Denmark (17) Norway (18) Germany, Belgium (19)
20 to 24.9	Ukraine (21)	Cyprus (22) Bosnia and Herzegovina (23) Ukraine (24)	Slovenia (20) United Kingdom (20) Poland, Ireland, Slovak Rep., Sweden (21) OECD Avg. , Hungary, Czech Rep. (22) France, Latvia, Austria, USA (23), Portugal (24) Spain, Luxembourg (24)
25 to 29.9	Int'l Avg. (25)	Israel (25) Bulgaria, Dubai-UAE, Lebanon (26) Romania (27)	Italy (25) Lithuania (26) Russian Fed. (29)
30 to 34.9	Dubai-UAE (31) Georgia (33)	 Int'l Avg. (33) Thailand (34)	Greece (30) Croatia (33)
35 to 39.9		Jordan, Tunisia (39)	Dubai-UAE, Israel (39)
40 or higher	Islamic Rep. of Iran (47) Algeria (59) Colombia (69) Tunisia (72), Morocco (74) El Salvador (78), Kuwait (79) Qatar (87) Yemen (94)	Turkey (41), Georgia (44) Islamic Rep. of Iran (49), Bahrain (51) Indonesia (52) Syrian Arab Rep., Egypt (53) Algeria, Morocco, Oman (59) Colombia, Palestinian Nat'l Auth. (61) Botswana (68), Kuwait (71) El Salvador (80), Saudi Arabia (82) Ghana (83), Qatar (84)	Rep. of Serbia (41), Turkey (42) Azerbaijan (45), Romania, Bulgaria (47) Uruguay (48), Mexico, Chile (51) Thailand, Trinidad and Tobago (53) Rep. of Montenegro (58), Kazakhstan (59) Argentina (64), Jordan (65), Albania (68) Brazil (69), Colombia (70) Peru, Tunisia, Qatar (74) Indonesia (77), Panama (79) Kyrgyz Rep. (87)

◻ = Below the Int'l Avg./OECD Avg. ◻ = Not measurably different from the Int'l Avg./OECD Avg. ◼ = Above the Int'l Avg./OECD Avg.

NOTE: Countries are listed by the percentage of students performing at the lowest proficiency levels (percentages in parentheses): below the *TIMSS Low International Benchmark* (400) for grades 4 or 8 and *PISA Proficiency Level 2* (420) for age 15. Education systems within the same percentage categories are ordered according to their unrounded value. International (Int'l)/OECD average scores and U.S. percentages are presented in bold font. Statistical significance (compared to the Int'l Avg./OECD Avg.) based on unrounded estimates. While the formulation and construction of assessment scales are the same across the TIMSS, PIRLS, and PISA, the content represented by the scale scores and proficiency levels is not the same across different ages within a subject domain.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS) 2007; Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA) 2009.

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SCIENCE

Percent of low-performing students

	Grade 4 (TIMSS 2007)	Grade 8 (TIMSS 2007)	Age 15 (PISA 2009)
Less than 5	MA-USA (1), Hong Kong-Ch., Latvia (2) Netherlands, Japan, Ch. Taipei (3) Alberta-Ca., Singapore, MN-USA (4) Br. Columbia-Ca., Russian Fed. (4) Quebec-Ca. (4)	Rep. of Korea, Czech Rep., Slovenia (3) Japan, MN-USA , MA-USA , Ontario-Ca., Hungary (4)	Shanghai-Ch. (3)
5 to 9.9	England-UK, Kazakhstan, Lithuania (5) Sweden, Ontario-Ca. (5), Italy, Germany (6) USA (6), Austria, Hungary, Australia (7) Czech Rep., Slovenia, Denmark (7) Slovak Rep. (8)	Br. Columbia-Ca., Ch. Taipei, Russian Fed. (5) England, Quebec-Ca. (6) Singapore, Lithuania (7) Hong Kong-Ch., USA , Australia (8) Sweden, Basque Country-Sp. (9)	Finland, Rep. of Korea (6) Hong Kong-Ch. (7) Estonia (8)
10 to 14.9	Scotland-UK (10) New Zealand (13)	Italy (12) Scotland-UK, Norway (13)	Canada, Macao-Ch. (10) Japan, Ch. Taipei, Liechtenstein (11) Singapore (11) Australia, Poland, Netherlands, New Zealand (13) Switzerland, Hungary (14)
15 to 19.9	Norway (16) Ukraine (18)	Ukraine (15) Armenia (17) Dubai-UAE (18) Rep. of Serbia (19)	Latvia, Slovenia, Germany, United Kingdom, Ireland (15) Norway (16) Portugal, Denmark, Lithuania, Czech Rep. (17) Iceland, OECD Avg. , Belgium, USA , Spain (18) Croatia (18), Sweden, Slovak Rep., France (19)
20 to 24.9	Int'l Avg. , Armenia (23)	Malaysia, Thailand, Bosnia and Herzegovina (20) Jordan (21) Bahrain (22), Tunisia (23) Romania (23) Islamic Rep. of Iran, Bulgaria, Syrian Arab Rep. (24)	Italy, Austria (21) Russian Fed. (22) Luxembourg (24)
25 to 29.9	Dubai-UAE (28)	Israel, Int'l Avg. (25) Cyprus (26) Malta, Turkey (29)	Greece (25)
30 to 34.9			Turkey (30) Dubai-UAE (31) Chile (32) Israel (33) Rep. of Serbia (34)
35 to 39.9	Islamic Rep. of Iran (35)	Indonesia (35) Oman, Georgia (39)	Bulgaria (39)
40 or higher	Georgia (41) Colombia (49) El Salvador (53) Kuwait (63) Algeria (67), Tunisia (68) Qatar (77), Morocco (79) Yemen (92)	Kuwait (40), Colombia (41) Lebanon, Algeria, Egypt (45) Palestinian Nat'l Auth. (46), Saudi Arabia (48) Morocco (49) El Salvador (58) Botswana (65) Qatar (71) Ghana (81)	Romania (41), Uruguay, Thailand (43) Jordan (46), Mexico (47) Trinidad and Tobago (50), Argentina (52) Rep. of Montenegro, Tunisia, Colombia, Brazil (54) Kazakhstan (55), Albania (57) Panama, Qatar (65), Indonesia (66) Peru (68) Azerbaijan (70) Kyrgyz Rep. (82)

■ = Below the Int'l Avg./OECD Avg. □ = Not measurably different from the Int'l Avg./OECD Avg. ■ = Above the Int'l Avg./OECD Avg.

NOTE: Countries are listed by the percentage of students performing at the lowest proficiency levels (percentages in parentheses); below the *TIMSS Low International Benchmark* (400) for grades 4 or 8 and *PISA Proficiency Level 2* (409) for age 15. Education systems within the same percentage categories are ordered according to their unrounded value. International (Int'l)/OECD average scores and U.S. percentages are presented in bold font. Statistical significance (compared to the Int'l Avg./OECD Avg.) based on unrounded estimates. While the formulation and construction of assessment scales are the same across the TIMSS, PIRLS, and PISA, the content represented by the scale scores and proficiency levels is not the same across different ages within a subject domain.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS) 2007; Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA) 2009.