

High-Performing Students: Percentage of U.S. Students at the Highest 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 highest 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.

This analysis compares the percentages of high-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. High-performing students are defined as those reaching the Advanced International Benchmarks on PIRLS and TIMSS and Proficiency Level 5 on PISA. For more information about international benchmarks or proficiency levels for each international assessment, see About This Analysis.

Results:

At grade 4, eight education systems had a higher percentage of high-performing students than the international average in mathematics, reading, and science, including England-UK, Hong Kong-China, Japan, Massachusetts, Minnesota, Russian Federation, Singapore, and the United States (though Japan, Massachusetts, and Minnesota did not participate in grade 4 reading).

>In the United States the percentage of high-performing students at grade 4 ranged from 12 percent in reading to 10 percent in mathematics to 15 percent in science.

>Twenty-four out of 56 participating education systems had 5 percent or less of high-performing 4th graders in mathematics, and 17 education systems had 5 percent or less of high-performing 4th graders out of 43 participating education systems in reading and 56 participating education systems in science.

>More than a third of 4th graders in Hong Kong-China and Singapore were high performers in mathematics.

At grade 8, eight education systems had a higher percentage of high-performing students than the international average in mathematics and science, including Chinese Taipei, Hong Kong-China, Hungary, Japan, Massachusetts, Republic of Korea, Russian Federation, and Singapore (reading was not assessed internationally at grade 8).

>U.S. 8th graders had a higher percentage of high performers in science and a percentage not measurably different in mathematics compared to the international average.

>Thirty-seven out of 56 participating education systems had 5 percent or less of high-performing 8th graders in mathematics, and 36 out of 56 education systems had 5 percent or less of high-performing 8th graders in science.

>More than a third of 8th graders in Chinese Taipei, Republic of Korea, and Singapore were high performers in mathematics.

At age 15, eleven education systems had a higher percentage of high-performing students than the international average in mathematics, reading, and science, including Australia, Belgium, Canada, Finland, Hong Kong-China, Japan, Netherlands, New Zealand, Republic of Korea, Shanghai-China, and Singapore.

>U.S. 15-year-olds had a higher percentage of high performers in reading, a lower percentage in mathematics, and a percentage not measurably different in science compared to the international average.

>At least 24 out of 65 participating education systems had 5 percent or less of high-performing 15-year-olds in reading, mathematics or science.

>Half of the 15-year-old students in Shanghai-China were high performers in mathematics.



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 which each country is weighted equally) in terms of the percentage of students scoring at the highest proficiency levels.

>For reading at grade 4 and mathematics and science at grades 4 and 8, the highest proficiency level is the TIMSS and PIRLS Advanced International Benchmark (a score of 625 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, comparisons are based on the percentage of students at or above PISA Proficiency Level 5 (in reading, the threshold score is 626, where the mean is 493 and s.d. is 100; in mathematics, the threshold score is 607 where the mean is 496 and s.d. is 100; in science, the threshold score is 633 where the mean is 501 and 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.

For descriptions of the knowledge and skills associated with proficiency levels see: 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).

Suggested citation: Harner, A.L. (2012). *High-Performing Students: Percentage of U.S. Students at the Highest 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*. U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved [date], from <http://nces.ed.gov/surveys/international/reports/2012-hps-mrs.asp>.

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 reading, mathematics, 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 high-performing students	Grade 4 (PIRLS 2006)		Age 15 (PISA 2009)	
50 or higher				
40.1 to 45				
35.1 to 40				
30.1 to 35				
25.1 to 30				
20.1 to 25				
15.1 to 20	Singapore, Russian Fed. (19) Alberta-Ca. (17) Bulgaria, Br. Columbia-Ca., Ontario-Ca. (16)		Shanghai-Ch. (19) New Zealand, Singapore (16)	
10.1 to 15	England-UK, Luxembourg, Hong Kong-Ch. (15) Hungary, Italy (14) New Zealand, Nova Scotia-Ca. (13) USA (12) Denmark, Germany, Sweden (11)		Finland (15) Japan, Rep. of Korea, Australia, Canada (13) Hong Kong-Ch. (12) Belgium (11)	
5.1 to 10	Israel, Scotland-UK (10) Latvia, Slovak Rep., Austria, Int'l Avg. (8) Belgium-Fl., Ch. Taipei, Poland (7), Quebec-Ca. (6) Netherlands, Slovenia (6)		USA , Netherlands, France (10), Sweden (9) Iceland (9) Norway, Switzerland, United Kingdom, Germany, OECD Avg. (8) Israel, Poland, Ireland (7) Hungary, Estonia, Italy, Luxembourg, Greece (6)	
5 or less	Lithuania, France, Spain (5) Romania (4) Iceland, Belgium-Fr., Rep. of Moldova (3) Rep. of Macedonia, Trinidad and Tobago, Norway, South Africa (2) Georgia, Islamic Rep. of Iran (1)		Dubai-UAE, Ch. Taipei, Czech Rep., Austria, Portugal, Denmark, Liechtenstein (5) Slovenia (5) Slovak Rep. (4) Spain, Croatia, Russian Fed., Latvia, Lithuania, Macao-Ch., Bulgaria (3) Trinidad and Tobago, Turkey, Uruguay, Qatar (2) Brazil, Chile, Argentina, Rep. of Serbia, Romania, Rep. of Montenegro (1) Colombia, Panama (1)	
Rounds to zero	Indonesia, Kuwait, Morocco, Qatar		Mexico, Albania, Azerbaijan, Indonesia, Jordan, Kazakhstan, Kyrgyz Rep., Peru, Thailand, Tunisia	

■ - 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 high proficiency levels (percentages in parentheses); at or above the *PIRLS Advanced International Benchmark* (625) for grade 4 and *PISA Proficiency Level 5* (626) 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 high-performing students	Grade 4 (TIMSS 2007)			Grade 8 (TIMSS 2007)			Age 15 (PISA 2009)		
50 or higher							Shanghai-Ch. (50)		
40.1 to 45				Ch. Taipei (45)					
35.1 to 40	Singapore (41) Hong Kong-Ch. (40)			Rep. of Korea, Singapore (40)			Singapore (36)		
30.1 to 35				Hong Kong-Ch. (31)			Hong Kong-Ch. (31)		
25.1 to 30				Japan (26)			Ch. Taipei (29) Rep. of Korea (26)		
20.1 to 25	Ch. Taipei (24) Japan (23) MA-USA (22)						Switzerland (24) Finland (22) Japan (21)		
15.1 to 20	Kazakhstan (19) MN-USA (18) England-UK, Russian Fed. (16)			MA-USA (16)			Belgium, Netherlands (20) New Zealand (19) Canada, Liechtenstein, Germany (18) Macao-Ch. (17) Australia (16)		
10.1 to 15	Latvia (11)						Slovenia (14) France, Iceland (14) Austria, OECD Avg. , Slovak Rep. (13) Estonia, Czech Rep., Denmark (12), Sweden (11) Luxembourg (11)		
5.1 to 10	USA , Lithuania (10) Hungary, Australia (9) Armenia, Int'l Avg. (8) Denmark, Netherlands (7) Germany, Italy (6)			Hungary (10) Russian Fed. (8) England-UK, Quebec-Ca., MN-USA (8) Lithuania, USA , Int'l Avg. , Australia, Ontario-Ca. (6) Armenia, Czech Rep. (6)			Poland, Norway, Hungary, USA , United Kingdom (10) Portugal (10) Italy (9), Spain (8) Lithuania, Ireland (7) Dubai-UAE, Israel, Greece, Latvia, Turkey (6)		
5 or less	Quebec-Ca., New Zealand, Slovak Rep. (5) Br. Columbia-Ca., Ontario-Ca., Scotland-UK (4) Alberta-Ca., Slovenia, Austria, Sweden (3) Ukraine, Czech Rep., Dubai-UAE, Norway (2) Georgia (1)			Turkey, Rep. of Serbia, Br. Columbia-Ca. (5) Malta (5), Bulgaria, Slovenia, Israel, Romania (4) Scotland-UK (4), Dubai-UAE, Thailand, Ukraine, Italy (3) Malaysia, Cyprus, Sweden, Basque Country-Sp. (2) Jordan, Bosnia and Herzegovina, Islamic Rep. of Iran (1) Lebanon, Georgia, Egypt (1)			Russian Fed., Croatia (5) Bulgaria, Rep. of Serbia (4) Trinidad and Tobago, Uruguay, Qatar (2) Chile, Thailand, Romania, Kazakhstan, Azerbaijan (1) Rep. of Montenegro, Argentina, Brazil, Mexico, Peru (1)		
Rounds to zero	Algeria, Colombia, El Salvador, Islamic Rep. of Iran, Kuwait, Morocco, Qatar, Tunisia, Yemen			Algeria, Bahrain, Botswana, Colombia, El Salvador, Ghana, Indonesia, Kuwait, Morocco, Norway, Oman, Palestinian Nat'l Auth., Qatar, Saudi Arabia, Syrian Arab Rep., Tunisia			Albania, Colombia, Indonesia, Jordan, Kyrgyz Rep., Panama, Tunisia		

■ - 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 high proficiency levels (percentages in parentheses); at or above the *TIMSS Advanced International Benchmark* (625) for grades 4 or 8 and *PISA Proficiency Level 5* (607) 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 high-performing students	Grade 4 (TIMSS 2007)	Grade 8 (TIMSS 2007)	Age 15 (PISA 2009)
50 or higher			
40.1 to 45			
35.1 to 40	Singapore (36)		
30.1 to 35		Singapore (32)	
25.1 to 30			
20.1 to 25	MA-USA (22)	Ch. Taipei (25)	Shanghai-Ch. (24)
15.1 to 20	Ch. Taipei (19) MN-USA (17) Russian Fed. (16)	MA-USA (20) Japan, England-UK, Rep. of Korea (17)	Singapore (20) Finland (19) New Zealand (18) Japan (17) Hong Kong-Ch. (16)
10.1 to 15	USA (15) England-UK, Hong Kong-Ch. (14) Hungary, Italy (13) Japan, Alberta-Ca., Armenia, Ontario-Ca. (12) Slovak Rep., Br. Columbia-Ca. (11)	Hungary (13) Czech Rep., Slovenia, Russian Fed., MN-USA (11)	Australia (15) Germany, Netherlands (13) Canada, Rep. of Korea (12) United Kingdom, Switzerland (11)
5.1 to 10	Australia, Latvia, Germany (10) Kazakhstan (10), Austria (9) Sweden, New Zealand, Int'l Avg. (8) Czech Rep., Denmark (7) Slovenia (6)	Hong Kong-Ch., USA (10) Australia, Lithuania (8) Armenia (8), Ontario-Ca., Br. Columbia-Ca. (7) Sweden, Dubai-UAE (6)	Estonia, Belgium, Slovenia (10) Liechtenstein (10), USA , Ch. Taipei, Ireland, OECD Avg. (9) Czech Rep., France, Sweden, Austria, Poland (8) Iceland, Denmark, Luxembourg (7) Norway, Slovak Rep., Italy, Dubai-UAE (6)
5 or less	Quebec-Ca. (5) Dubai-UAE, Scotland-UK, Netherlands (4) Lithuania (3) Ukraine, Islamic Rep. of Iran (2) Norway, Colombia, Georgia (1)	Int'l Avg. , Jordan, Malta, Bulgaria, Scotland-UK, Israel (5) Quebec-Ca. (4) Italy (4), Turkey, Ukraine, Thailand, Malaysia, Basque Country-Sp. (3) Islamic Rep. of Iran, Bahrain, Rep. of Serbia, Romania (2) Norway, Bosnia and Herzegovina (2) Cyprus, Palestinian Nat'l Auth., Lebanon, Syrian Arab Rep. (1) Egypt, Oman, Colombia (1)	Hungary, Macao-Ch., Lithuania (5) Russian Fed., Portugal, Spain, Israel, Croatia (4) Latvia, Greece, Bulgaria (3) Trinidad and Tobago, Uruguay (2) Qatar, Turkey, Chile, Rep. of Serbia, Argentina (1) Thailand, Brazil (1)
Rounds to zero	Algeria, El Salvador, Kuwait, Morocco, Qatar, Tunisia, Yemen	Algeria, Botswana, El Salvador, Georgia, Ghana, Indonesia, Kuwait, Morocco, Qatar, Saudi Arabia, Tunisia	Mexico, Albania, Azerbaijan, Colombia, Indonesia, Jordan, Kazakhstan, Kyrgyz Rep., Rep. of Montenegro, Panama, Peru, Romania, Tunisia

■ - Below the Int'l Avg./OECD Avg.
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 ■ - Above the Int'l Avg./OECD Avg.

NOTE: Countries are listed by the percentage of students performing at high proficiency levels (percentages in parentheses); at or above the *TIMSS Advanced International Benchmark* (625) for grades 4 or 8 and *PISA Proficiency Level 5* (633) 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.