

# DATA POINT

U.S. DEPARTMENT OF EDUCATION  
JULY 2014 NCES 2014-103

## *Problem Solving Skills of 15-Year-Olds: Results from PISA 2012*

The Program for International Student Assessment (PISA) is an international assessment that measures 15-year-old students' reading, mathematics, and science literacy and, in 2012, general problem solving and financial literacy. PISA is coordinated by the Organization for Economic Cooperation and Development (OECD), an intergovernmental organization of industrialized countries, and is conducted in the United States by NCES. In 2012, all 34 OECD member countries and 31 other education systems, some of which are countries and some of which are subnational entities, participated in PISA, for a total of 65 participating education systems. Forty-four of the 65 education systems administered the problem solving assessment. The PISA computer-based assessment of problem solving assessed how well prepared students are to confront the kinds of problems that are encountered almost daily in 21st century life. More information about the PISA problem solving assessment is available at [www.pisa.oecd.org](http://www.pisa.oecd.org).

### **How did U.S. 15-year-olds perform, on average, on the Program for International Student Assessment (PISA) problem solving assessment compared to their peers in 43 other education systems?**

- Average scores in problem solving ranged from 562 in Singapore to 399 in Colombia. The U.S. average score was 508, which was higher than the OECD average of 500. The U.S. average was lower than the average in ten education systems, higher than the average in twenty-two education systems, and not measurably different from the average in eleven education systems (table 1).

### **What were the percentages of top performers and low performers on the PISA problem solving assessment?**

- Percentages of top performing 15-year-old students (those scoring at level 5 or above) in problem solving ranged from 29 percent in Singapore to 1 percent in Colombia, Malaysia, Montenegro, and Uruguay. In the United States, 12 percent of 15-year-old students scored at proficiency level 5 or above, which was not measurably different than the OECD average of 11 percent. The U.S. percentage of top performers was lower than in eleven education systems, higher than in twenty-two education systems, and not measurably different than in ten education systems (figure 1).
- The percentage of 15-year-old students scoring below level 2, which is considered a baseline of proficiency by the OECD, ranged from 7 percent in Korea and Japan to 61 percent in Colombia. In the United States, 18 percent of 15-year-old students scored below level 2, which was lower than the OECD average of 21 percent and the percentage in twenty education systems. The U.S. percentage of low performers was higher than the percentage in nine education systems and not measurably different from the percentage in fourteen education systems (figure 1).

Data in this report are from the Program for International Student Assessment (PISA), an international assessment of 15-year-old students, a sample-based survey. To learn more, visit <http://nces.ed.gov/surveys/pisa>. For questions about content or to view this report online, go to <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014103>.

**TABLE 1. Average scores of 15-year-old students on PISA problem solving scale, by education system: 2012**

Education system	Average score	s.e.	Education system	Average score	s.e.
OECD average (PS)	500	0.7			
<i>Singapore</i>	562	1.2	Denmark	497	2.9
Korea, Republic of	561	4.3	Portugal	494	3.6
Japan	552	3.1	Sweden	491	2.9
<i>Macao-China</i>	540	1.0	<i>Russian Federation</i>	489	3.4
<i>Hong Kong-China</i>	540	3.9	Slovak Republic	483	3.6
<i>Shanghai-China</i>	536	3.3	Poland	481	4.4
<i>Chinese Taipei</i>	534	2.9	Spain	477	4.1
Canada	526	2.4	Slovenia	476	1.5
Australia	523	1.9	<i>Serbia, Republic of</i>	473	3.1
Finland	523	2.3	<i>Croatia</i>	466	3.9
United Kingdom	517	4.2	Hungary	459	4.0
Estonia	515	2.5	Turkey	454	4.0
France	511	3.4	Israel	454	5.5
Netherlands	511	4.4	Chile	448	3.7
Italy	510	4.0	<i>Cyprus</i>	445	1.4
Czech Republic	509	3.1	<i>Brazil</i>	428	4.7
Germany	509	3.6	<i>Malaysia</i>	422	3.5
<b>United States</b>	<b>508</b>	<b>3.9</b>	<i>United Arab Emirates</i>	411	2.8
Belgium	508	2.5	<i>Montenegro, Republic of</i>	407	1.2
Austria	506	3.6	<i>Uruguay</i>	403	3.5
Norway	503	3.3	<i>Bulgaria</i>	402	5.1
Ireland	498	3.2	<i>Colombia</i>	399	3.5

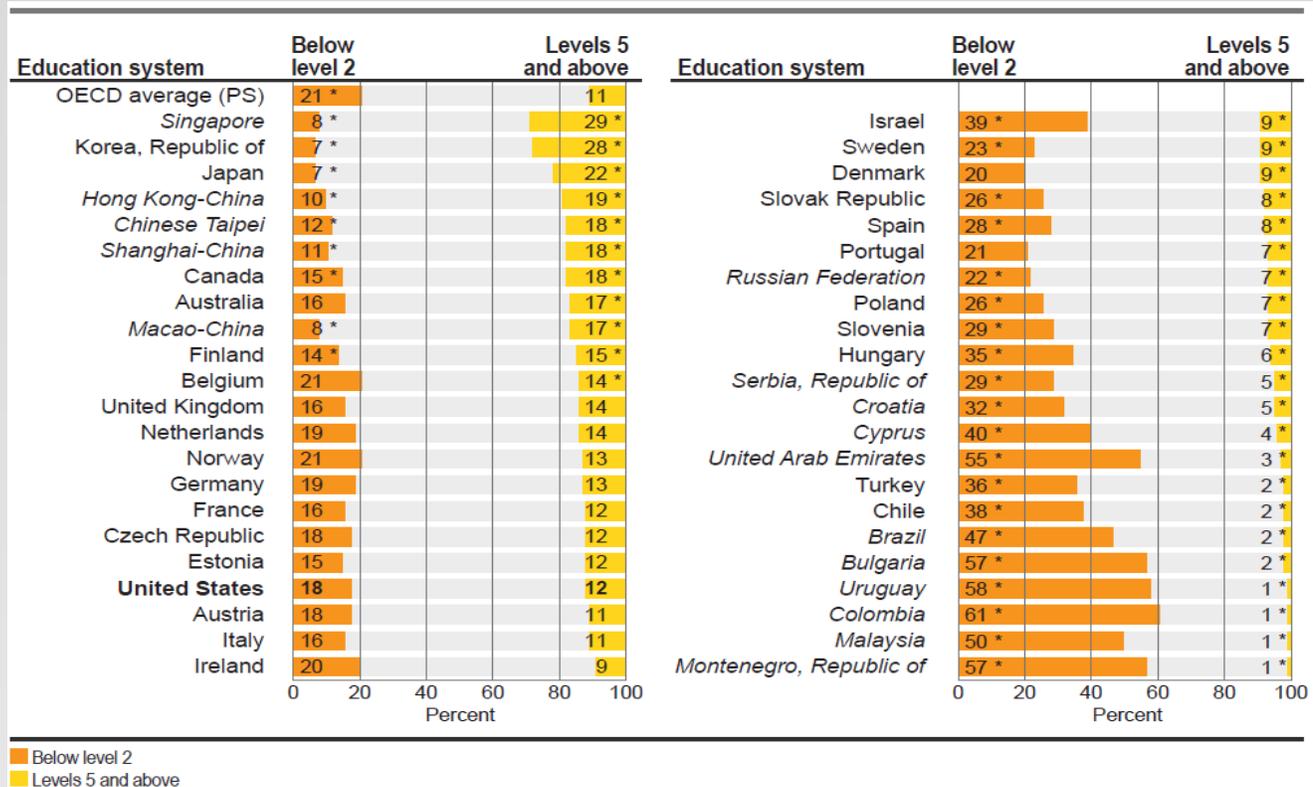
▲ Average score is higher than U.S. average score.

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

NOTE: Education systems are ordered by 2012 average score. 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. The OECD average (PS) is the average of the national averages of the 28 OECD member countries that participated in the problem solving (PS) assessment, with each country weighted equally. Standard error is noted by s.e. Italics indicate non-OECD countries and education systems.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012.

**FIGURE 1. Percentage of 15-year-old students performing at PISA problem solving proficiency level 5 and above and below level 2, by education system: 2012**



\* $p < .05$ . 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 in level 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 problem solving levels according to their scores on a scale from 0 to 1,000. Exact cut scores are as follows: below level 1 (a score less than or equal to 358.49); level 1 (a score greater than 358.49 and less than or equal to 423.42); level 2 (a score greater than 423.42 and less than or equal to 488.35); level 3 (a score greater than 488.35 and less than or equal to 553.28); level 4 (a score greater than 553.28 and less than or equal to 618.21); level 5 (a score greater than 618.21 and less than or equal to 683.14); and level 6 (a score greater than 683.14). Standard errors are available in table PS1b at: <http://nces.ed.gov/surveys/pisa/pisa2012/index.asp>. The OECD average (PS) is the average of the national percentages of the 28 OECD member countries that participated in the problem solving (PS) assessment, with each country weighted equally. Italics indicate non-OECD countries and education systems.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012.

This NCES Data Point presents information on education topics of current interest. It was authored by Patrick Gonzales and Dana Kelly of NCES. Estimates based on samples are subject to sampling variability, and apparent differences may not be statistically significant. All noted differences are statistically significant at the .05 level. In the design,

conduct, and data processing of National Center for Education Statistics (NCES) surveys, efforts are made to minimize the effects of nonsampling errors, such as item nonresponse, measurement error, data processing error, or other systematic error.