

PROGRAMME FOR INTERNATIONAL STUDENT ASSESSMENT (PISA) RESULTS FROM PISA 2018

The Programme for International Student Assessment (PISA) is a triennial survey of 15-year-old students around the world that assesses the extent to which they have acquired the key knowledge and skills essential for full participation in society. The assessment focuses on the core school subjects of reading, mathematics and science. Students' proficiency in an innovative domain is also assessed; in 2018, this domain was global competence.

United States

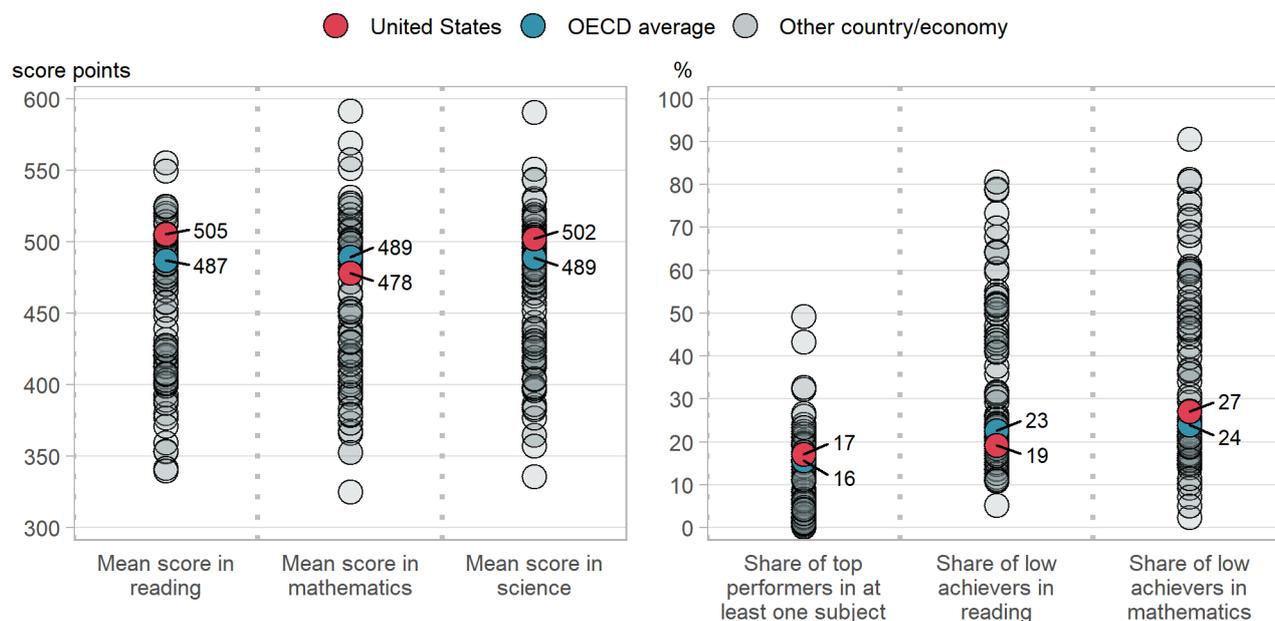
Key findings

- Students in the United States performed above the OECD average in reading (505 score points) and science (502), and below the OECD average in mathematics (478). Their scores were similar to those of students in Australia, Germany, New Zealand, Sweden and the United Kingdom in at least two of these three subjects. The trend lines of United States' mean performance in reading since 2000, mathematics since 2003 and science since 2006 are stable, with no significant improvement or decline. Nevertheless, in reading, the share of 15-year-old students who scored at Level 5 or 6 (top performers) increased by almost 4 percentage points – a statistically significant increase – between 2009 and 2018, to 13.5%.
- As in many countries, socio-economically advantaged students in the United States outperformed disadvantaged students in reading, mathematics and science. In reading, the performance gap between socio-economically advantaged and disadvantaged students was 99 score points (OECD average: 89 score points). Some 27% of advantaged students in the United States, but only 4% of disadvantaged students (OECD averages: 17% and 3%, respectively), were top performers in reading, meaning that they attained one of the two highest proficiency levels. However, 10% of disadvantaged students in the United States were able to score amongst the top quarter of students in their country in reading.
- The gender gap in reading in favour of girls was 24 score points in the United States (OECD average: 30 score points). In the United States, boys outperformed girls in mathematics (by 9 score points), while in science boys and girls performed similarly. Amongst high-performing students in mathematics or science, about three in ten boys in the United States expect to work as an engineer or science professional at the age of 30, while only one in ten girls expects to do so.
- In the United States, the proportion of students with an immigrant background was 19% in 2009 and 23% in 2018 (the change between 2009 and 2018 was not statistically significant). Amongst these immigrant students, about two in five were socio-economically disadvantaged. While immigrants and non-immigrants scored at a similar level before accounting for students' and schools' socio-economic profile, immigrant students outperformed their native-born peers by 16 score points after accounting for these factors. Immigrant students were also more than 25% less likely than non-immigrant students to be low performers after taking into account students' and schools' socio-economic profile, and gender.

- Sizeable proportions of students who performed poorly in the United States still held ambitious expectations about their future education. More than three in four low-performing students reported that they expect to complete tertiary education (compared to 48% on average across OECD countries).
- When it comes to school climate, the United States was the only participating country where students with a stronger sense of belonging at school scored lower (by 4 score points) in reading than students with a weaker sense of belonging, after controlling for students' and schools' socio-economic profile. By contrast, the United States was amongst those countries and economies where students' sense of belonging at school was most positively related to their expectations to complete a tertiary degree, which includes earning a bachelor's, master's or doctoral degree (ISCED 5A and 6). In addition, students in the United States reported significantly more competition than co-operation amongst their schoolmates to a greater degree than students in any other PISA-participating country/economy.
- Holding a growth mindset is positively related to better academic performance in almost every education system. This is especially true for 15-year-old students in the United States. Students who disagreed or strongly disagreed with the statement "Your intelligence is something about you that you can't change very much" scored 58 points higher in reading than students who agreed or strongly agreed with the statement, after accounting for students' and schools' socio-economic profile (OECD average: 32 score points higher).

What 15-year-old students in the United States know and can do

Figure 1. Snapshot of performance in reading, mathematics and science



Note: Only countries and economies with available data are shown.

Source: OECD, PISA 2018 Database, Tables I.1 and I.10.1.

- Students in the United States scored higher than the OECD average in reading, lower than the OECD average in mathematics, and higher than the OECD average in science.
- Compared to the OECD average (16%), a similar share of students in the United States (17%) performed at the highest levels of proficiency (Level 5 or 6) in at least one subject; in particular, a higher share of students scored at the highest levels of proficiency in reading or in science, but a smaller percentage scored at the highest levels of proficiency in mathematics. At the same time,

compared to the OECD average, a similar proportion of students in the United States (87%) achieved a minimum level of proficiency (Level 2 or higher) in at least one subject.

What students know and can do in reading

- In the United States, 81% of students attained at least Level 2 proficiency in reading (OECD average: 77%). At a minimum, these students can identify the main idea in a text of moderate length, find information based on explicit, though sometimes complex criteria, and can reflect on the purpose and form of texts when explicitly directed to do so.
- Some 14% of students in the United States were top performers in reading, meaning that they attained Level 5 or 6 in the PISA reading test (OECD average: 9%). At these levels, students can comprehend lengthy texts, deal with concepts that are abstract or counterintuitive, and establish distinctions between fact and opinion, based on implicit cues pertaining to the content or source of the information. In 20 education systems, including those of 15 OECD countries, more than 10% of 15-year-old students were top performers.

What students know and can do in mathematics

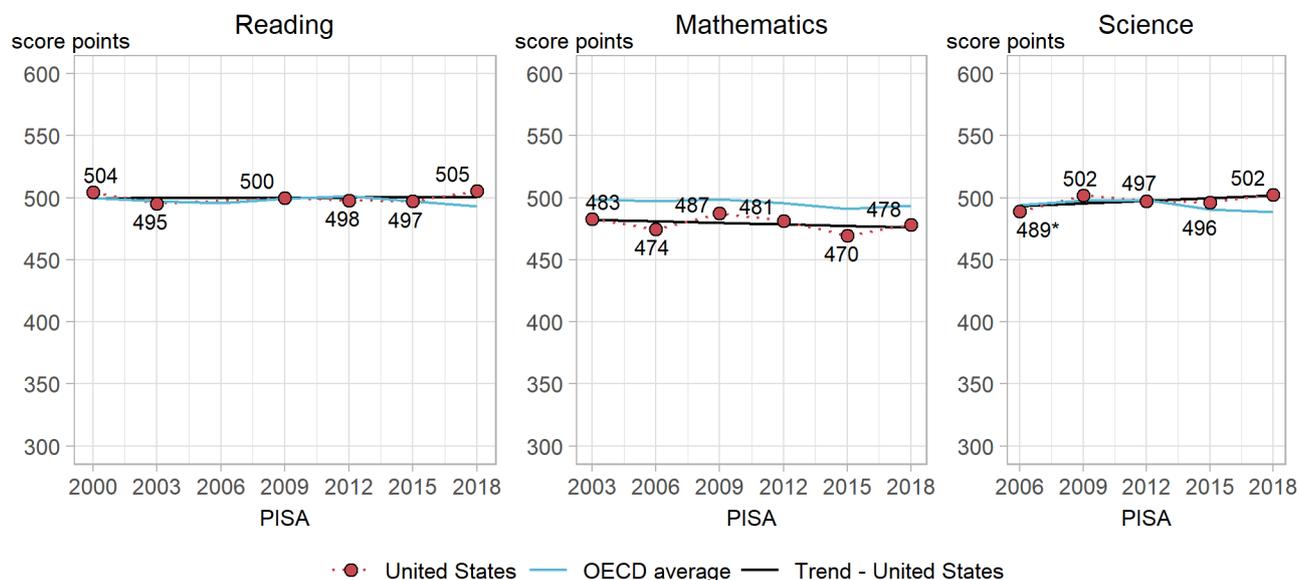
- Some 73% of students in the United States attained Level 2 or higher in mathematics (OECD average: 76%). At a minimum, these students can interpret and recognise, without direct instructions, how a (simple) situation can be represented mathematically (e.g. comparing the total distance across two alternative routes, or converting prices into a different currency). The share of 15-year-old students who attained minimum levels of proficiency in mathematics (Level 2 or higher) varied widely – from 93% in Singapore to just 9% in Dominican Republic. On average across OECD countries, 76% of students attained at least Level 2 proficiency in mathematics.
- In the United States, 8% of students scored at Level 5 or higher in mathematics (OECD average: 11%). Six Asian countries and economies had the largest shares of students who did so: Beijing, Shanghai, Jiangsu and Zhejiang (China) (44%), Singapore (37%), Hong Kong (China) (29%), Macao (China) (28%), Chinese Taipei (23%) and Korea (21%). These students can model complex situations mathematically, and can select, compare and evaluate appropriate problem-solving strategies for dealing with them.

What students know and can do in science

- Some 81% of students in the United States attained Level 2 or higher in science (OECD average: 78%). At a minimum, these students can recognise the correct explanation for familiar scientific phenomena and can use such knowledge to identify, in simple cases, whether a conclusion is valid based on the data provided.
- In the United States, 9% of students were top performers in science, meaning that they were proficient at Level 5 or 6 (OECD average: 7%). These students can creatively and autonomously apply their knowledge of and about science to a wide variety of situations, including unfamiliar ones.

Performance trends

Figure 2. Trends in performance in reading, mathematics and science



Note: * indicates statistically mean-performance estimates that are significantly above or below PISA 2018 estimates for the United States.

The blue line indicates the average mean performance across OECD countries with valid data in all PISA assessments. The red dotted line indicates mean performance in the United States. The black line represents a trend line for the United States (line of best fit).

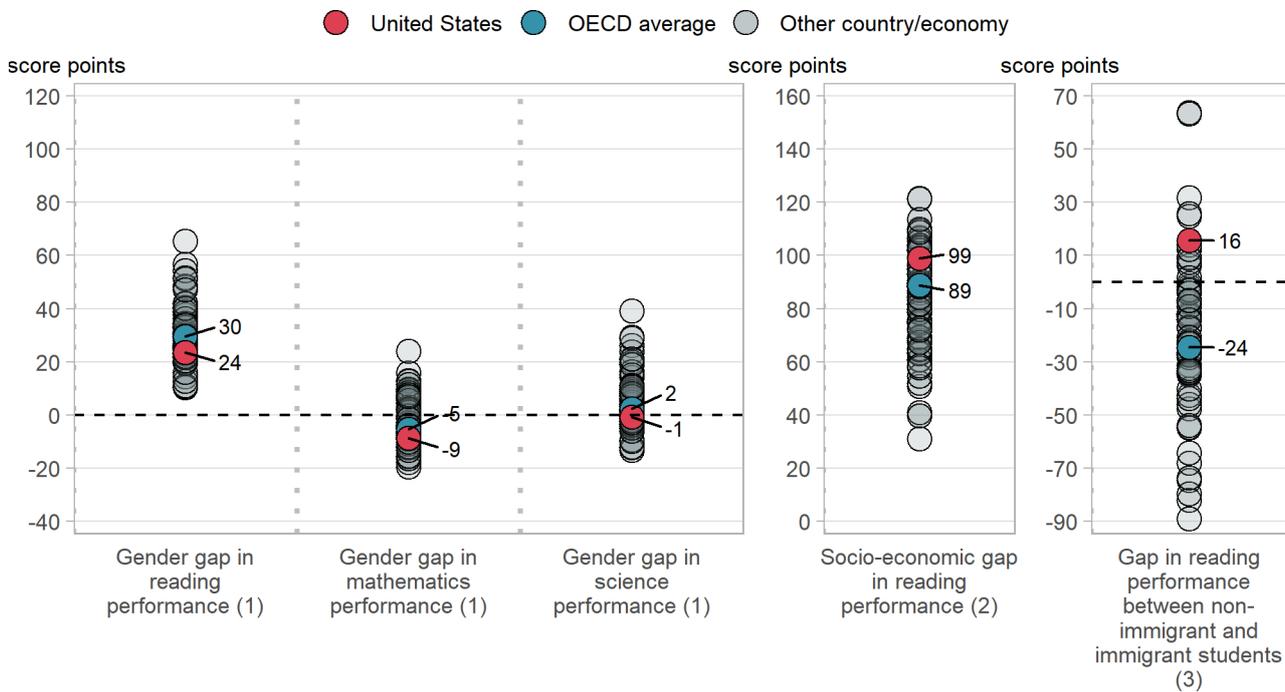
The PISA 2006 reading literacy results are not reported for the United States because of an error in printing the test booklets.

Source: OECD, PISA 2018 Database, Tables I. B1.10, I. B1.11 and I. B1.12.

- Mean performance in reading, mathematics and science in the United States remained about the same in every PISA assessment, with no significant improvement or decline. Only science performance in 2006 was significantly below the 2018 mean score, but even in science, performance has not changed significantly and has followed a flat trajectory since 2009.
- Nevertheless, in reading, the share of 15-year-old students scoring at Level 5 or 6 (top performers) increased by almost 4 percentage points between 2009 and 2018, to 13.5%. In science, some improvements were observed amongst the lowest-achieving students, and the gap between the lowest- and the highest-achieving students narrowed; the share of 15-year-old students scoring below Level 2 proficiency in science shrank by 5.7 percentage points between 2006 and 2018.

Where All Students Can Succeed

Figure 3. Differences in performance and expectations related to personal characteristics



Note: Only countries and economies with available data are shown. (1) Girls' minus boys' performance; (2) Advantaged minus disadvantaged students' performance; (3) Immigrants' minus non-immigrants' performance in reading. After accounting for students' and schools' socio-economic profile.

Source: OECD, PISA 2018 Database, Tables II.B1.2.3, II.B1.7.1 and II.B1.9.3.

Equity related to gender

- In all countries and economies that participated in PISA 2018, girls significantly outperformed boys in reading – by 30 score points on average across OECD countries. In the United States, the gender gap in reading (24 score points) was not significantly different from the average gap. The gap was similar to that observed in 2009 (25 score points), and both boys' and girls' performance remained stable over the period.
- In the United States, boys outperformed girls in mathematics by nine score points. Across OECD countries, boys outperformed girls by five score points. While girls slightly outperformed boys in science (by two score points) on average across OECD countries in PISA 2018, in the United States girls and boys performed similarly in science.
- Amongst high-performing students in mathematics or science, about three in ten boys in the United States expect to work as an engineer or science professional at the age of 30, while only one in ten girls expects to do so. About two in five high-performing girls expect to work in health-related professions, while only about one in seven high-performing boys expects to do so. Some 7% of boys and 1% of girls in the United States expect to work in ICT-related professions.

Equity related to immigrant background

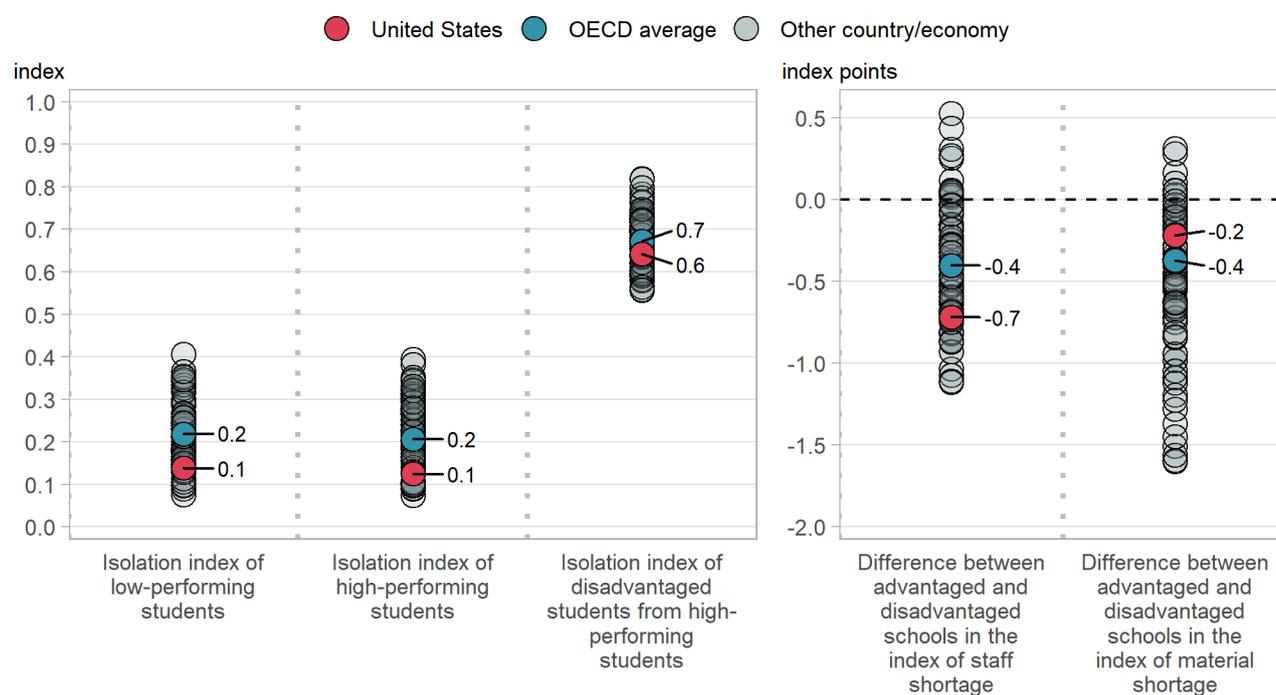
- In 2018, some 23% of students in the United States had an immigrant background. Amongst these immigrant students, about two in five were socio-economically disadvantaged.
- There is no statistically significant difference in reading performance between immigrant and non-immigrant students in the United States. After accounting for students' and schools' socio-economic profile the difference shrank to 16 score points.
- On average across OECD countries, 17% of them scored in the top quarter of reading performance in 2018. In the United States, 24% of immigrant students performed at that level.

Equity related to socio-economic status

- In the United States, socio-economically advantaged students outperformed disadvantaged students in reading by 99 score points in PISA 2018 (OECD average: 89 score points). This is not significantly different from the average difference between the two groups (89 score points) across OECD countries. In PISA 2009, the performance gap related to socio-economic status was 107 score points in the United States (and 87 score points on average across OECD countries).
- Some 27% of advantaged students in the United States, but only 4% of disadvantaged students, were top performers in reading in PISA 2018. On average across OECD countries, 17% of advantaged students, and 3% of disadvantaged students were top performers in reading.
- Socio-economic status was a strong predictor of performance in mathematics and science in all PISA participating countries. It explained 16% of the variation in mathematics performance in PISA 2018 in the United States (compared to 14% on average across OECD countries), and 12% of the variation in science performance (compared to the OECD average of 13% of the variation).
- Some 10% of disadvantaged students in the United States were able to score in the top quarter of reading performance in the United States. On average across OECD countries, 11% of disadvantaged students scored amongst the highest performers in reading in their countries.

In the United States, low- and high-performing students are clustered in the same schools less often than the OECD average.

Figure 4. School segregation and gap in material and staff shortage between advantaged and disadvantaged schools



Notes: Only countries and economies with available data are shown. The isolation indices ranging from 0 (no segregation) to 1 (full segregation) measure whether low-/high-performing students or disadvantaged students are more or less concentrated in some schools. See detailed description of the indices in Volume II Annex A3.

Source: OECD, PISA 2018 Database, Tables II.B1.4.1, II.B1.4.8, II.B1.5.13 and II.B1.5.14.

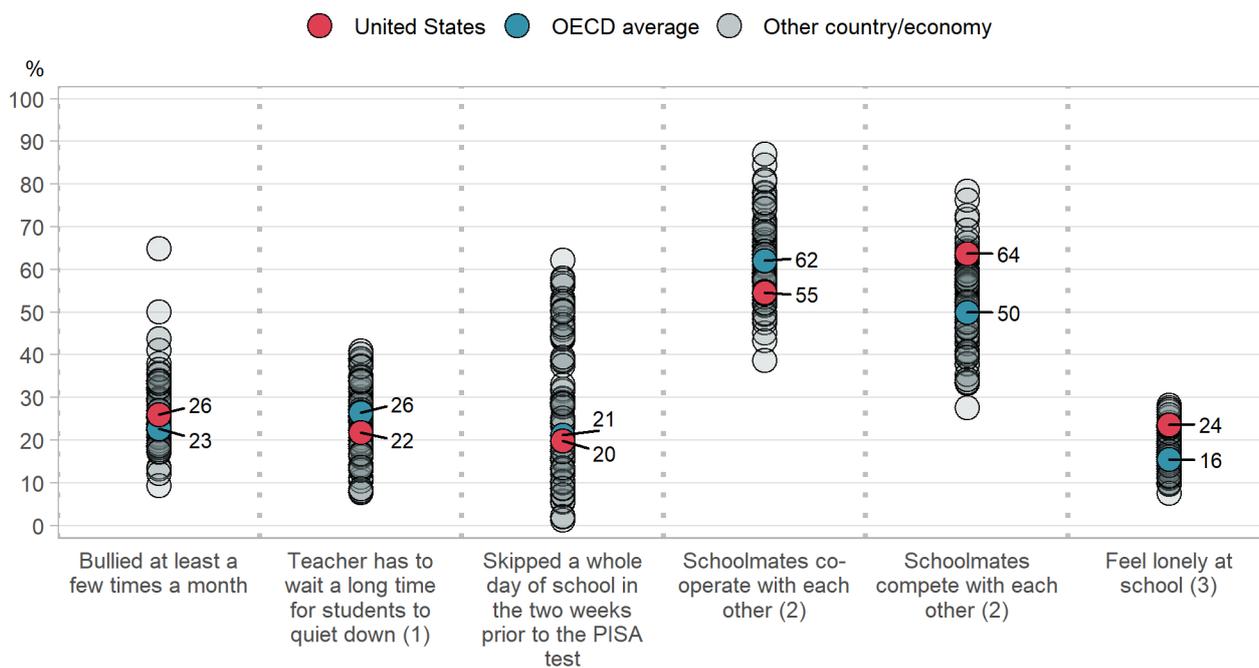
- Compared to the OECD average (27%), a similar share of students in the United States (26%) attend a school whose principal reported that the school's capacity to provide instruction is hindered by a lack of teaching staff. In the United States, 12% of students, compared to 25% of students across OECD countries, attend a school whose principal reported that a lack of educational material hinders learning. Students in disadvantaged schools were more likely than students in advantaged schools to attend a school with a lack of teaching staff. In the United States, 48% of students enrolled in disadvantaged schools and 5% of students enrolled in advantaged schools attend a school whose principal reported that the capacity of the school to provide instruction is hindered at least to some extent by a lack of teaching staff. On average across OECD countries, 34% of students in disadvantaged schools and 18% of students in advantaged schools attend such a school.
- According to school principals in the United States, 84% of teachers in advantaged schools and 97% in disadvantaged schools are "fully certified". The proportion of teachers with at least a master's degree is larger in advantaged schools than in disadvantaged schools. In the United States, 26% of teachers in disadvantaged schools while 12% in advantaged schools have less than five years of professional experience.
- Many students, especially disadvantaged students, hold lower ambitions than would be expected given their academic achievement. In the United States, one in nine high-achieving disadvantaged students – but 1 in 100 high-achieving advantaged students – do not expect to complete tertiary education.

What School Life Means for Students' Lives

How is the school climate in the United States?

- In the United States, 26% of students reported being bullied at least a few times a month, compared to 23% on average across OECD countries. At the same time, 93% of students in the United States (and 88% of students on average across OECD countries) agreed or strongly agreed that it is a good thing to help students who cannot defend themselves.
- Some 22% of students in the United States (OECD average: 26%) reported that, in every or most language-of-instruction lessons, their teacher has to wait a long time for students to quiet down. In the United States, students who reported that, in every or most lessons, the teacher has to wait a long time for students to quiet down scored 33 score points lower in reading than students who reported that this never happens or happens only in some lessons, after accounting for socio-economic status.
- On average across OECD countries, 21% of students had skipped a day of school and 48% of students had arrived late for school in the two weeks prior to the PISA test. In the United States, 20% of students had skipped a day of school and 43% of students had arrived late for school during that period. In most countries and economies, frequently bullied students were more likely to have skipped school, whereas students who valued school and those who enjoyed a better disciplinary climate were less likely to skip school. Students who received greater emotional support from parents were also less likely to have skipped school.

Figure 5. School climate



Note: Only countries and economies with available data are shown. (1) In every or most language-of-instruction lessons; (2) Very or extremely true; (3) Agreed or strongly agreed.

Source: OECD, PISA 2018 Database, Tables III.B1.2.1, III.B1.3.1, III.B1.4.1, III.B1.7.3, III.B1.7.5, III.B1.8.1, III.B1.8.2 and III.B1.9.1

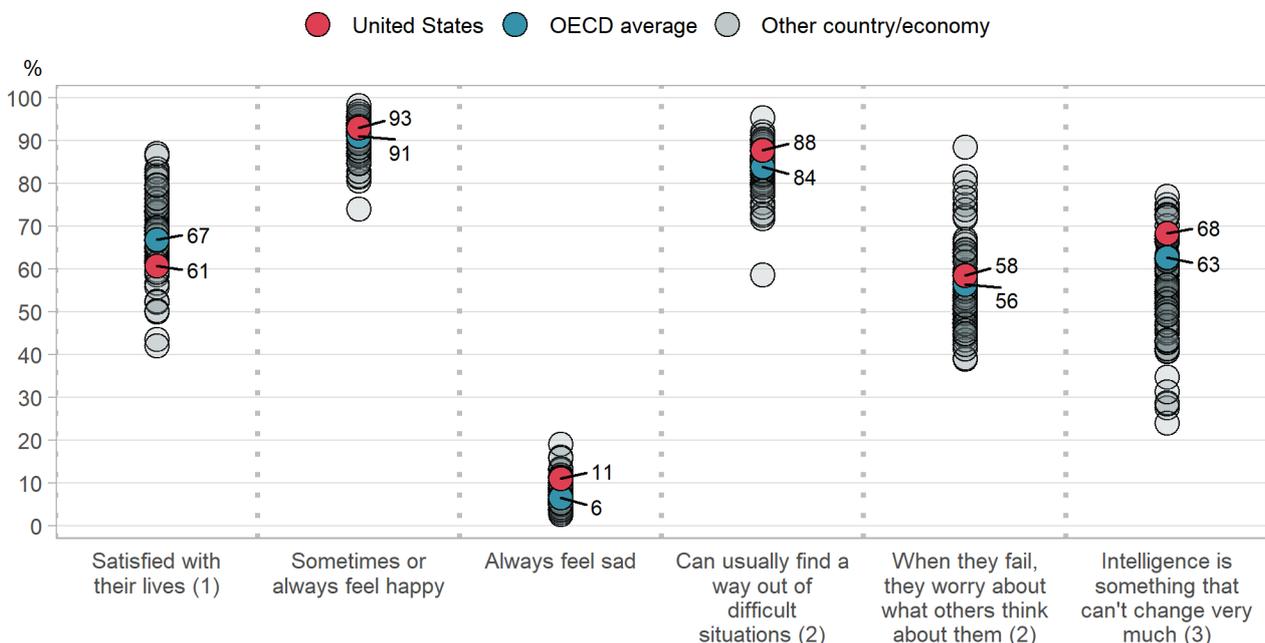
- Some 83% of students in the United States (OECD average: 74%) agreed or strongly agreed that their teacher shows enjoyment in teaching. In most countries and economies, including in the United States, students scored higher in reading when they perceived their teacher as more enthusiastic, especially when students said their teachers are interested in the subject.

- In the United States, 55% of students reported that their schoolmates co-operate with each other (OECD average: 62%) and 64% reported that they compete with each other (OECD average: 50%).
- Some 24% of students in the United States (OECD average: 16%) agreed or strongly agreed that they feel lonely at school.

How do students in the United States feel about their lives?

- In the United States, 61% of students (OECD average: 67%) reported that they are satisfied with their lives (i.e. students who reported between 7 and 10 on the 10-point life-satisfaction scale).
- Some 93% of students in the United States reported sometimes or always feeling happy and about 11% of students reported always feeling sad. In most countries and economies, students were more likely to report positive feelings when they reported a stronger sense of belonging at school and greater student co-operation, and were also more likely to express sadness when they were bullied more frequently.
- In the United States, 88% of students agreed or strongly agreed that they can usually find a way out of difficult situations (OECD average: 84%), and 58% agreed or strongly agreed that, when they fail, they worry about what others think of them (OECD average: 56% of students). In almost every education system, including in the United States, girls expressed greater fear of failure than boys, and this gender gap was considerably wider amongst top-performing students.
- A majority of students across OECD countries hold a growth mindset (i.e. they disagreed or strongly disagreed with the statement "Your intelligence is something about you that you can't change very much"). In the United States, 68% of students hold a growth mindset.

Figure 6. Student well-being and growth mindset



Notes: Only countries and economies with available data are shown. Based on students' self-reports. (1) Students who reported between 7 and 10 on the life-satisfaction scale (the life-satisfaction scale ranges from 0 to 10); (2) Percentage of students who agreed or strongly agreed with the statement; (3) Percentage of students who disagreed or strongly disagreed with the statement.

Source: OECD, PISA 2018 Database, Tables III.B1.11.1, III.B1.12.1, III.B1.12.2, III.B1.13.1, III.B1.13.2 and III.B1.14.1

Key features of PISA 2018

The content

- The PISA 2018 survey focused on reading, with mathematics, science and global competence as minor areas of assessment. PISA 2018 also included an assessment of young people's financial literacy, which was optional for countries and economies. The United States participated in the assessment of financial literacy, but did not participate in the assessment of global competence. Results are released on 3 December 2019 and in 2020.

The students

- Some 600 000 students completed the assessment in 2018, representing about 32 million 15-year-olds in the schools of the 79 participating countries and economies. In the United States, 4 838 students, in 215 schools, completed the assessment, representing 3 559 045 15-year-old students (86% of the total population of 15-year-olds).

The assessment

- Computer-based tests were used in most countries, with assessments lasting a total of two hours. In reading, a multi-stage adaptive approach was applied in computer-based tests whereby students were assigned a block of test items based on their performance in preceding blocks.
- Test items were a mixture of multiple-choice questions and questions requiring students to construct their own responses. The items were organised into groups based on a passage of text describing a real-life situation. More than 15 hours of test items for reading, mathematics, science and global competence were covered, with different students taking different combinations of test items..
- Students also answered a background questionnaire, which took about 35 minutes to complete. The questionnaire sought information about the students themselves, their attitudes, dispositions and beliefs, their homes, and their school and learning experiences. School principals completed a questionnaire that covered school management and organisation, and the learning environment.
- Some countries/economies also distributed additional questionnaires to elicit more information. These included: in 19 countries/economies, a questionnaire for teachers asking about themselves and their teaching practices; and in 17 countries/economies, a questionnaire for parents asking them to provide information about their perceptions of and involvement in their child's school and learning.
- Countries/economies could also chose to distribute three other optional questionnaires for students: 52 countries/economies distributed a questionnaire about students' familiarity with computers; 32 countries/economies distributed a questionnaire about students' expectations for further education; and 9 countries/economies distributed a questionnaire, developed for PISA 2018, about students' well-being. Of these optional questionnaires, the United States distributed the teacher questionnaire and the questionnaire about students' familiarity with computers.

Map of PISA countries and economies



OECD member countries

Australia
Austria
Belgium
Canada
Chile
Colombia
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Japan
Korea
Latvia

Lithuania
Luxembourg
Mexico
Netherlands
New Zealand
Norway
Poland
Portugal
Slovak Republic
Slovenia
Spain
Sweden
Switzerland
Turkey
United Kingdom
United States*

Partner countries and economies in PISA 2018

Albania
Argentina
Baku (Azerbaijan)
Belarus
Bosnia and Herzegovina
Brazil
Brunei Darussalam
B-S-J-Z (China)**
Bulgaria
Costa Rica
Croatia
Cyprus¹
Dominican Republic
Georgia
Hong Kong (China)
Indonesia
Jordan
Kazakhstan
Kosovo
Lebanon
Macao (China)

Malaysia
Malta
Republic of Moldova
Montenegro
Morocco
Republic of North Macedonia
Panama
Peru
Philippines
Qatar
Romania
Russian Federation
Saudi Arabia
Serbia
Singapore
Chinese Taipei
Thailand
Ukraine
United Arab Emirates
Uruguay
Viet Nam

Partner countries and economies in previous cycles

Algeria
Azerbaijan
Guangdong (China)
Himachal Pradesh (India)
Kyrgyzstan
Liechtenstein
Mauritius
Miranda (Venezuela)
Tamil Nadu (India)
Trinidad and Tobago
Tunisia

* Puerto Rico participated in the PISA 2015 assessment (as an unincorporated territory of the United States).

** B-S-J-Z (China) refers to four PISA 2018 participating Chinese provinces/municipalities: Beijing, Shanghai, Jiangsu and Zhejiang. In PISA 2015, the four PISA participating Chinese provinces/municipalities were: Beijing, Shanghai, Jiangsu and Guangdong.

1. **Note by Turkey:** The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

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For more information about PISA 2018 visit <http://www.oecd.org/pisa/>

Data can also be found on line by following the *StatLinks*  under the tables and charts in the publication.

Explore, compare and visualise more data and analysis using: <http://gpseducation.oecd.org/>.

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