



## 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.

### Japan

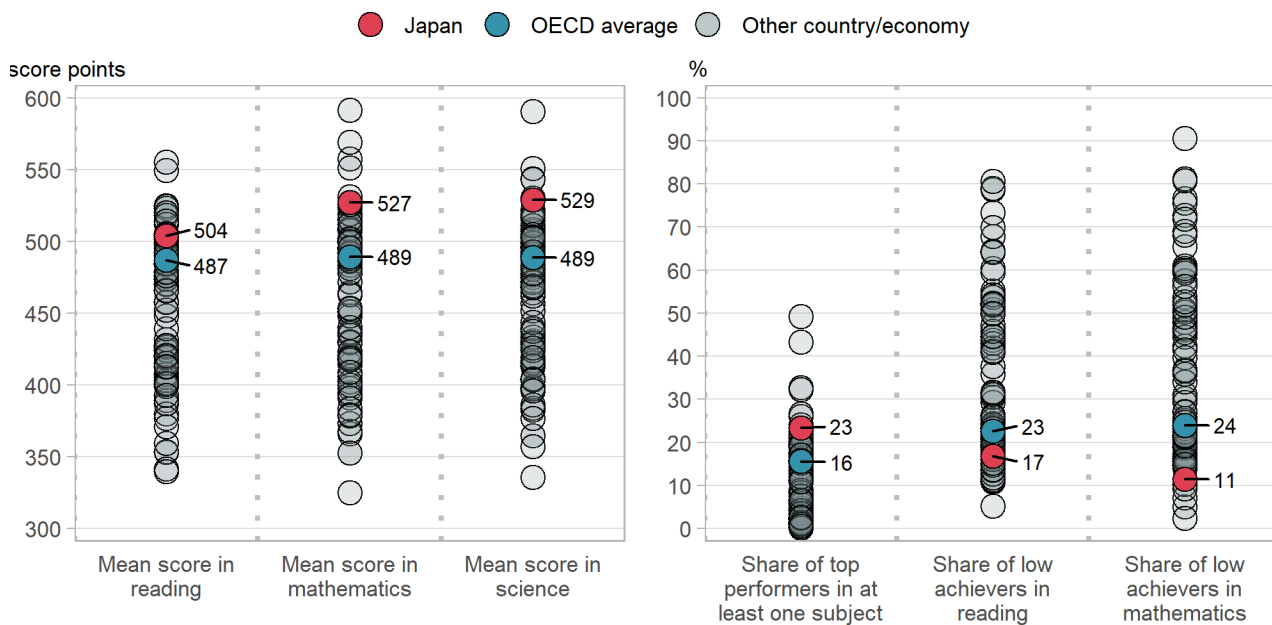
#### Key findings

- In Japan, 15-year-old students scored higher than the OECD average in reading (504 score points), mathematics (527) and science (529). In reading, ten countries and economies outperformed Japan, including the four participating Chinese provinces/municipalities (Beijing, Shanghai, Jiangsu and Zhejiang), Canada, Estonia, Finland, Hong Kong (China), Ireland, Korea, Macao (China), Poland and Singapore. The following nine countries/economy scored at the same level as Japan: Australia, Denmark, Germany, New Zealand, Norway, Sweden, Chinese Taipei, the United Kingdom and the United States. In mathematics, four countries/economies outperformed Japan, including the four participating Chinese provinces, Hong Kong (China), Macao (China) and Singapore, while Estonia, Korea and Chinese Taipei scored at the same level as Japan. In science, the four participating Chinese provinces, Macao (China) and Singapore outperformed Japan, while Estonia scored at the same level as Japan.
- Mean mathematics performance was stable between 2003 and 2018 in Japan. In contrast, no overall direction of change can be determined for trends in reading and science performance as mean performance in these subjects changed significantly. However, both in reading and in science, the recent trends were clearly negative.
- The gender gap in reading (20 score points) amongst students in Japan was narrower than the OECD average gap (30 score points). The gap shrank by 18 points since 2009 because girls' performance declined while boys' performance remained stable over the period.
- In Japan, advantaged students outperformed disadvantaged students in reading, but the difference was smaller than the average difference between the two groups across OECD countries. The performance gap related to socio-economic status did not change between 2009 and 2018.
- In Japan, 17% of students reported being bullied at least a few times a month (OECD average: 23%) and less than 3% of students reported that their belongings were taken away or destroyed (OECD average: 6.6%). Yet 80% of students in Japan agreed or strongly agreed that it is a good thing to help students who cannot defend themselves (OECD average: 88%), while 93% of students thought that it was a wrong thing to join in bullying (OECD average: 88%).
- Students in Japan reported one of the highest levels of fear of failure. In Japan, 77% agreed or strongly agreed that, when they fail, they worry about what others think of them (OECD average: 56% of students). PISA results show that students in high-performing countries/economies tended to report

higher level of fear of failure. In almost every education system, including in Japan, girls expressed greater fear of failure than boys, and this gender gap was considerably wider amongst top-performing students.

## What 15-year-old students in Japan 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 Japan scored higher than the OECD average in reading, mathematics and science.
- Compared to the OECD average, in Japan, a larger proportion of students performed at the highest levels of proficiency (Level 5 or 6) in at least one subject; at the same time a larger proportion of students achieved a minimum level of proficiency (Level 2 or higher) in at least one subject.

### What students know and can do in reading

- In Japan, 83% 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 10% of students in Japan 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 89% of students in Japan 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 98% in the four participating Chinese provinces/municipalities to 2% in Zambia, which participated in the PISA for Development assessment in 2017. On average across OECD countries, 76% of students attained at least Level 2 proficiency in mathematics.

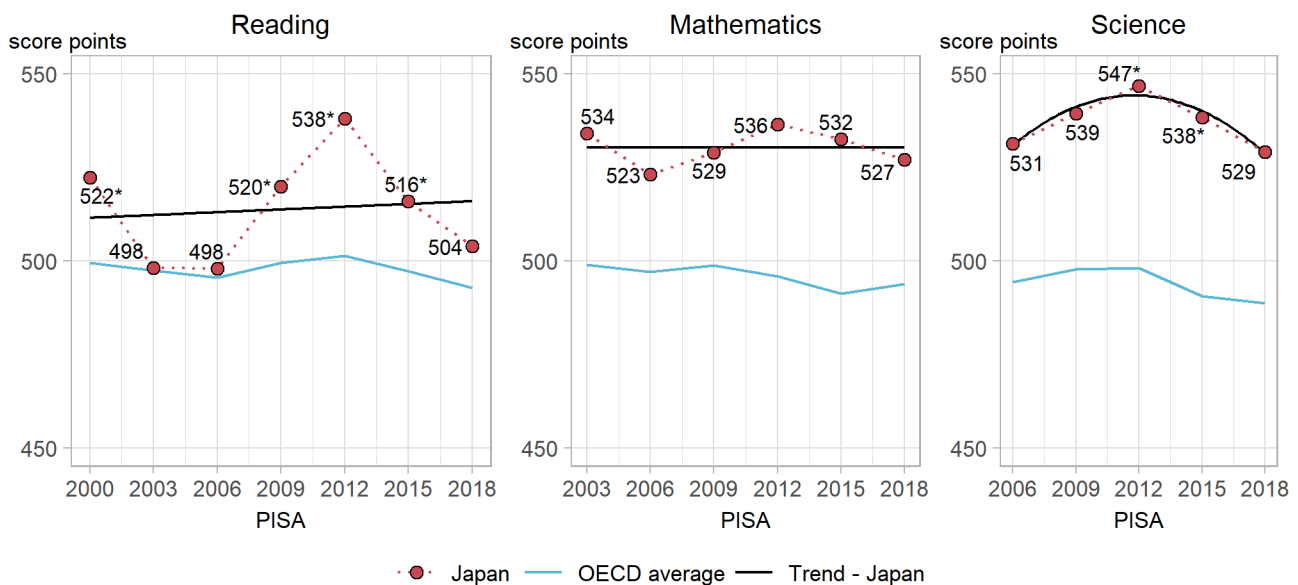
- In Japan, 18% of students scored at Level 5 or higher in mathematics (OECD average: 11%). Six Asian countries and economies had the largest shares of students who did so: Beijing, Shanghai, Jiangsu and Zhejiang (China) (44%), Singapore (37%), Hong Kong (China) (29%), Macao (China) (28%), Chinese Taipei (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 89% of students in Japan 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 Japan, 13% 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



Notes: \* indicates mean-performance estimates that are statistically significantly above or below PISA 2018 estimates for Japan.

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 Japan. The black line represents a trend line for Japan (line of best fit).

Source: OECD, PISA 2018 Database, Tables I. B.1.10, I. B.1.11 and I. B.1.12.

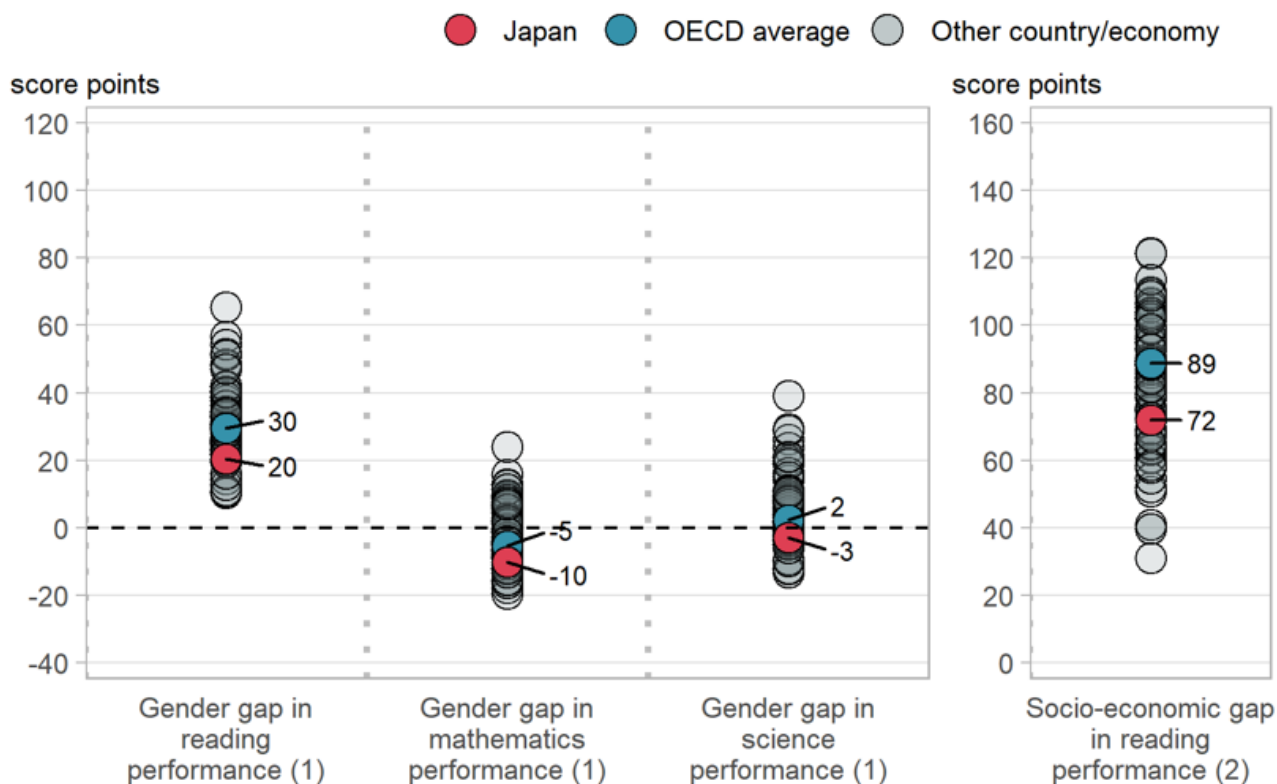
- Mean mathematics performance in Japan remained stable over the 2003-18 period, with no significant improvement or deterioration over any sub-period. However, this apparent stability hides distinct trends

amongst students at different levels in the performance distribution. Amongst the highest-achieving students in particular, performance tended to decline (by 2.7 score points, on average, per 3-year period; although this trend is not significantly different from 0, it is significantly different from the trend observed amongst the lowest-achieving students).

- While no overall direction of change can be determined for reading and science trends in Japan, mean performance in these subjects has been characterised by significant instability. Results appeared more stable when considering only years in which each subject was assessed fully (2000, 2009 and 2018 for reading; 2006 and 2015 for science), perhaps indicating that some of this instability is related to changes in subject coverage in the “off” years (such changes were particularly marked in PISA cycles prior to 2015). Even so, in reading, the more recent trend was clearly negative. In science too, mean performance in 2018 was below Japan’s performance in PISA 2012 and 2015.
- Similar to mathematics, trends amongst the highest-performing students in science tended to be more negative than amongst the lowest-performing students. This narrowing gap in performance is not observed in reading.

## Where All Students Can Succeed

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



Notes: Only countries and economies with available data are shown. (1) Girls’ minus boys’ performance; (2) Advantaged minus disadvantaged students’ performance.

Source: OECD, PISA 2018 Database, Tables II.B1.2.3, II.B1.7.1, II.B1.7.3, II.B1.7.5 and II.B1.9.3.

### Equity related to socio-economic status

- In Japan, socio-economically advantaged students outperformed disadvantaged students in reading by 72 score points in PISA 2018. This is smaller than the average difference between the two groups (89 score points) across OECD countries. In PISA 2009, the performance gap related to socio-

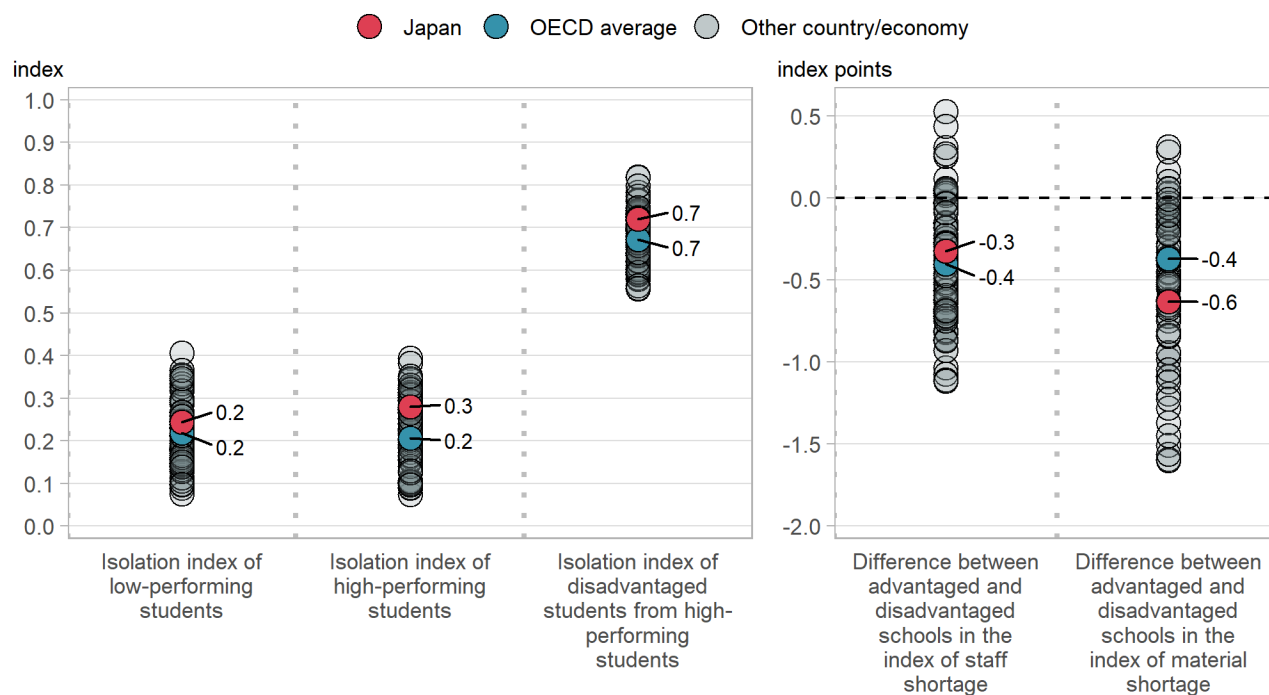
economic status was 74 score points in Japan (and 87 score points on average across OECD countries).

- Some 18% of advantaged students in Japan, but 3% 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 also a predictor of performance in mathematics and science in all PISA participating countries. It explained 9% of the variation in mathematics performance in PISA 2018 in Japan (compared to 14% on average across OECD countries), and 8% of the variation in science performance (compared to the OECD average of 13% of the variation).
- Some 12% of disadvantaged students in Japan were able to score in the top quarter of reading performance, indicating that disadvantage is not destiny. On average across OECD countries, 11% of disadvantaged students scored amongst the highest performers in reading in their countries.
- In Japan, low-performing students are clustered in certain schools to the same extent as the OECD average; and high-performing students are clustered in certain schools more often than the OECD average.
- A disadvantaged student has a 14% chance, on average, of being enrolled in a school with those who score in the top quarter of reading performance (OECD average: a 17% chance).
- In Japan, school principals reported more staff and material shortages than the OECD average, and principals of disadvantaged schools more often reported staff shortage than principals of advantaged schools did. Some 61% of students enrolled in a disadvantaged school and 40% of students enrolled in an advantaged school in Japan attend a school whose principals 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.
- Many students, especially disadvantaged students, hold lower ambitions than would be expected given their academic achievement. As on average across OECD countries, in Japan, about three in ten high-achieving disadvantaged students – but fewer than one in ten high-achieving advantaged students – do not expect to complete tertiary education.

### ***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 Japan, the gender gap in reading (20 score points) was smaller than average. The gender gap was narrower than that observed in 2009 (39 score points), although boys' performance remained stable over the period.
- In Japan, boys outperformed girls in mathematics by 10 score points, which is wider than the average gender gap in mathematics performance across OECD countries (5 score points). While girls slightly outperformed boys in science (by two score points), on average across OECD countries in PISA 2018, in Japan girls and boys performed similarly in science.
- Amongst high-performing students in mathematics or science, fewer than one in ten boys in Japan expects to work as an engineer or science professional at the age of 30, while only about 1 in 30 girls expects to do so. One in four high-performing girls expects to work in health related professions, while only one in eight high-performing boys expects so. Only 6% of boys, and 1% of girls in Japan expect to work in ICT-related professions.

**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 Chapter 4.

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

## What School Life Means for Students' Lives

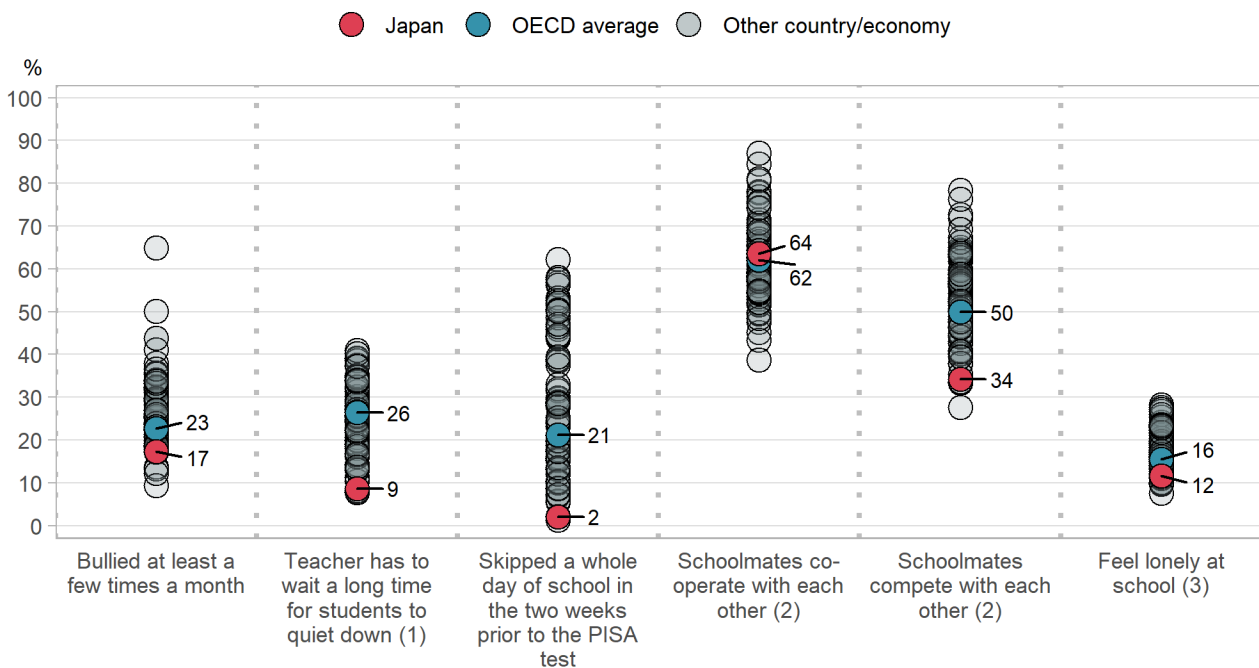
### How is the school climate in Japan?

- In Japan, 17% of students reported being bullied at least a few times a month (OECD average: 23%) and less than 3% of student reported that their belongings were taken away or destroyed (OECD average: 6.6%). Yet 80% of students in Japan agreed or strongly agreed that it is a good thing to help students who cannot defend themselves (OECD average: 88%), while 93% of students thought that it was a wrong thing to join in bullying (OECD average: 88%).
- Some 9% of students in Japan (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 Japan, students who reported that, in every or most lessons, the teacher has to wait a long time for students to quiet down scored 37 score points lower in reading than students who reported that this never happened or happened 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 Japan, 2% of students had skipped a day of school and 13% 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, enjoyed a better disciplinary climate, scored higher in the reading assessment and received greater emotional support from parents were less likely to have skipped school.
- Some 70% of students in Japan (OECD average: 74%) agreed or strongly agreed that the teacher showed enjoyment in teaching. In most countries and economies, including in Japan, students scored

higher in reading when they perceived their teacher as more enthusiastic, especially when students said their teachers were interested in the subject.

- When students in Japan were asked about their learning environment, 64% of students reported that their schoolmates co-operate with each other (OECD average: 62%) and 34% reported that they compete with each other (OECD average: 50%).
- Some 12% of students in Japan (OECD average: 16%) agreed or strongly agreed that they feel lonely at 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.B1.8.1, III.B1.8.2 and III.B1.9.1

### How do students in Japan feel about their lives?

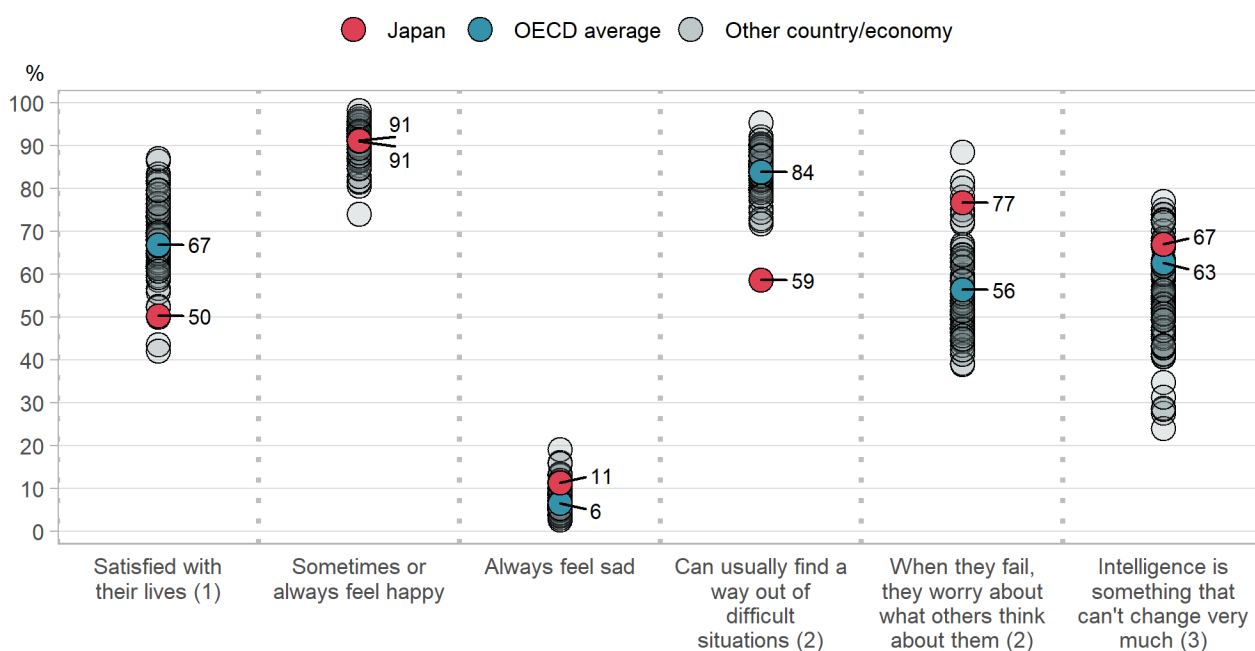
- In Japan, 50% of students (OECD average: 67%) reported that they are satisfied with their lives (students who reported between 7 and 10 on the 10-point life-satisfaction scale).
- Some 91% of students in Japan reported sometimes or always feeling happy and about 11% of students reported always feeling sad. In most countries and economies, including Japan, students were more likely to report positive feelings when they reported a stronger sense of belonging at school and greater student co-operation. Students were more likely to express sadness when they were bullied more frequently.
- In Japan, 59% of students agreed or strongly agreed that they can usually find a way out of difficult situations (OECD average: 84%). However, unlike in many other countries, in Japan there was no difference in reading scores between students who agreed with the statement and those who disagreed. Furthermore, in Japan, 77% of students agreed or strongly agreed that, when they fail, they

worry about what others think of them (OECD average: 56% of students). PISA results show that students in high-performing countries/economies tended to report higher level of fear of failure. In almost every education system, including in Japan, girls expressed greater fear of failure than boys, and this gender gap was considerably wider amongst top-performing students.

**Do students in Japan hold a growth mindset?**

- A majority of students across OECD countries holds a growth mindset (they disagreed or strongly disagreed with the statement "Your intelligence is something about you that you can't change very much"). In Japan, 67% of students hold a growth mindset.

**Figure 6. Student well-being and growth mindset**



Notes: Only countries and economies with available data are shown. (1) Between 7 and 10 on the life-satisfaction scale; (2) Agreed or strongly agreed; (3) Disagreed or strongly disagreed.

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 assessed reading, with mathematics, science and global competence, with reading as main focus. PISA 2018 also included an assessment of young people's financial literacy, which was optional for countries and economies. Japan did not participate in the assessments of global competence and financial literacy. Results for reading, mathematics and science are released on 3 December 2019 and results for global competence and financial literacy 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 Japan, 6 109 students completed the assessment, representing 1 078 921 15-year-old students (91% 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.

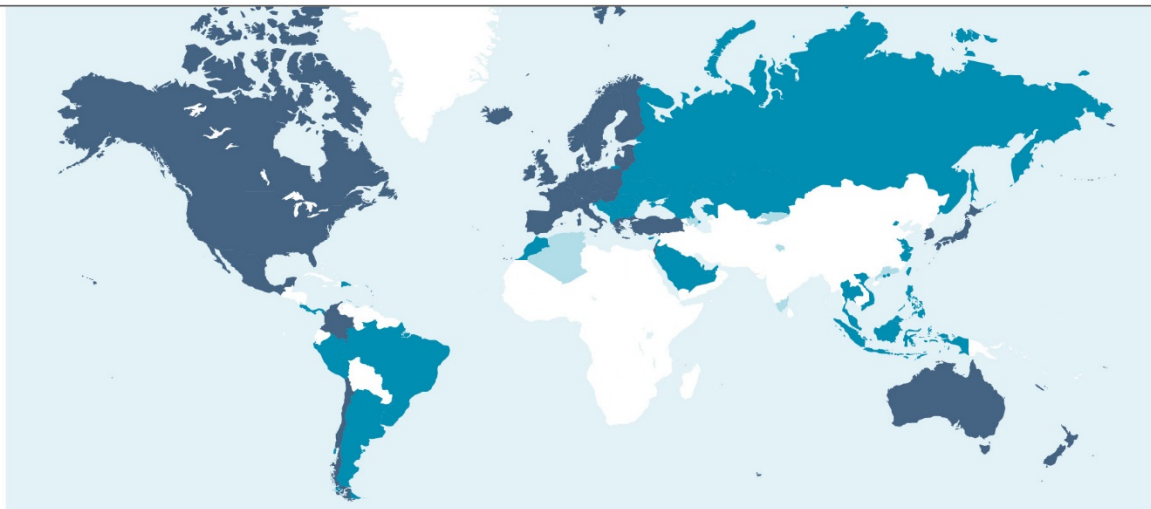
### **References**

OECD (2019), *PISA 2018 Results (Volume I): What Students Know and Can Do*, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/5f07c754-en>

OECD (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed*, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/b5fd1b8f-en>

OECD (2019), *PISA 2018 Results (Volume III): What School Life Means for Students' Lives*, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/acd78851-en>

## 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  
Cyprus  
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.

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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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