



## 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.

### Luxembourg

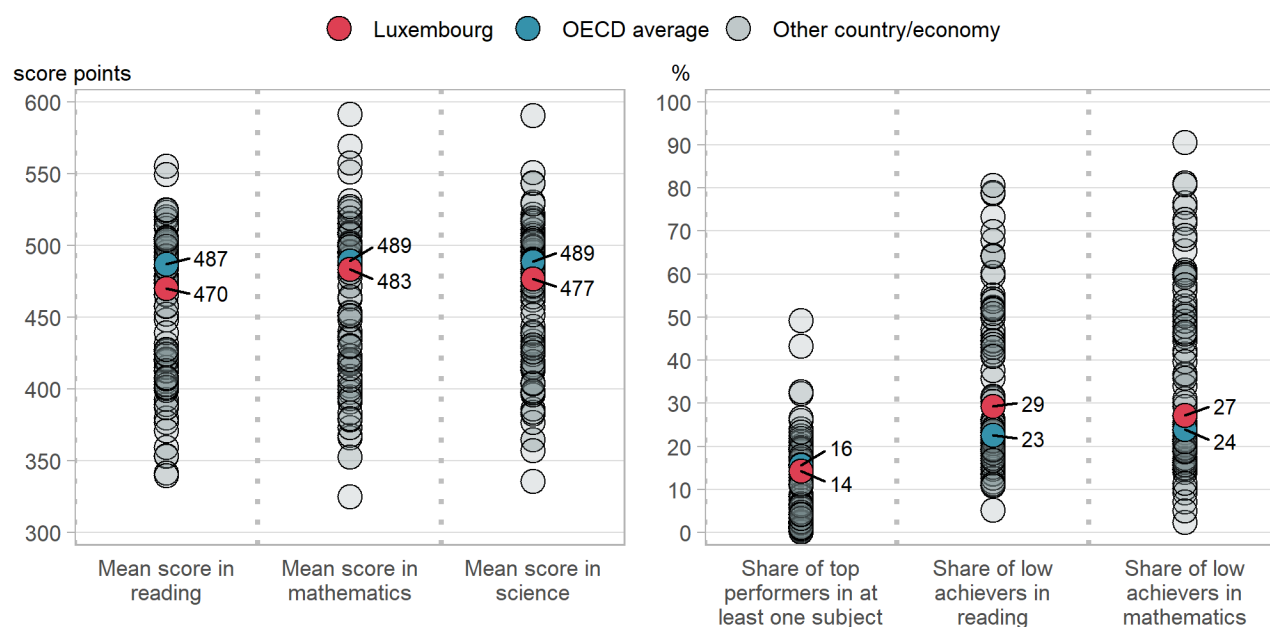
#### Key points

- Students in Luxembourg scored 470 points in reading on average in PISA 2018, below the OECD average (487 score points) and below the average performance of almost all European countries. Performance in science, 477 points, on average, was also below the OECD average (487 score points) and was one of the lowest observed across European countries. Students in Luxembourg scored 483 in mathematics, below the OECD average (489 score points). Luxembourg ranked between 25th and 29th in average mathematics performance, on a par with Hungary, Italy, Lithuania, the Russian Federation, the Slovak Republic, Spain and the United States.
- Mean performance in reading and science in Luxembourg was lower in 2018 than in the most recent assessments (2012 and 2015): performance declined by 11 score points in reading and by 6 score points in science between 2015 and 2018. By contrast, mean mathematics performance in 2018 was close to its level in 2015, but 10 score points lower than in 2003.
- In 2018, some 55% of 15-year-old students in Luxembourg had an immigrant background, up from 40% in 2009. This is the largest increase observed amongst PISA-participating countries. Amongst these immigrant students, three in eight were socio-economically disadvantaged, a proportion similar to the OECD average.
- The average difference in reading performance between immigrant and non-immigrant students in Luxembourg was 17 score points in favour of non-immigrant students, after accounting for students' and schools' socio-economic profile (OECD average difference: 24 score points). Unlike what is observed in many PISA-participating countries, first-generation immigrant students in Luxembourg performed better in reading than second-generation immigrant students.
- The link between socio-economic status and performance in PISA is stronger in Luxembourg than in any other PISA-participating country. Advantaged students in Luxembourg outperformed disadvantaged students in reading by 122 score points in PISA 2018 – a difference 33 points larger than the OECD average difference of 89 score points.

- Only 8% of disadvantaged students in Luxembourg were able to score in the top quarter of reading performance in their own country. This is one of the smallest shares observed amongst PISA-participating countries; only in Bulgaria, Peru and the United Arab Emirates were smaller proportions of “academically resilient” students observed. In Canada, Estonia, Ireland and the United Kingdom, all of which scored above the OECD average, more than 13% of disadvantaged students scored amongst the highest performers in reading in their country (OECD average: 11%).
- In Luxembourg, 84% of students who are enrolled in a disadvantaged school (OECD average: 34%) and 50% of students who are enrolled in an advantaged school (OECD average: 18%) 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. According to school principals in Luxembourg, 85% of teachers in advantaged schools, but 75% in disadvantaged schools, hold at least a master’s degree.
- Many students, especially disadvantaged students, hold lower ambitions than would be expected given their academic achievement. In Luxembourg, about one in three high-achieving disadvantaged students – while only one in seven high-achieving advantaged students– did not expect to complete tertiary education.
- The career expectations of the highest-achieving 15-year-old students reflect strong gender stereotypes. Amongst high-performing students in mathematics or science, one in four boys in Luxembourg expects to work as an engineer or science professional at the age of 30, while only about one in seven girls expects to do so. One in four high-performing girls in Luxembourg expects to work in health-related professions, while only one in ten high-performing boys expects so. Only 8% of boys and 1% of girls in Luxembourg expect to work in ICT-related professions.
- According to school principals in Luxembourg, the parents of fewer than one in two students discussed their child’s progress with a teacher (OECD average: one in six), and fewer than one in ten parents participated in local school government (OECD average: one in six). When asked about the factors that hinder their participation in school activities, parents in Luxembourg commonly cited obstacles that were time-related, such as the need to work (28%) and the inconvenience of meeting times (29%).

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

- Students in Luxembourg scored 470 points in reading in PISA 2018, below the OECD average (487 score points). Luxembourg ranked between 29th and 31st in average reading performance, on a par with Belarus, Iceland, Israel, Turkey and Ukraine.
- In Luxembourg, 71% of students attained at least Level 2 proficiency in reading (OECD average: 77%). 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 8% of students were top performers in reading, meaning that they attained Level 5 or 6 in the PISA reading test. 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***

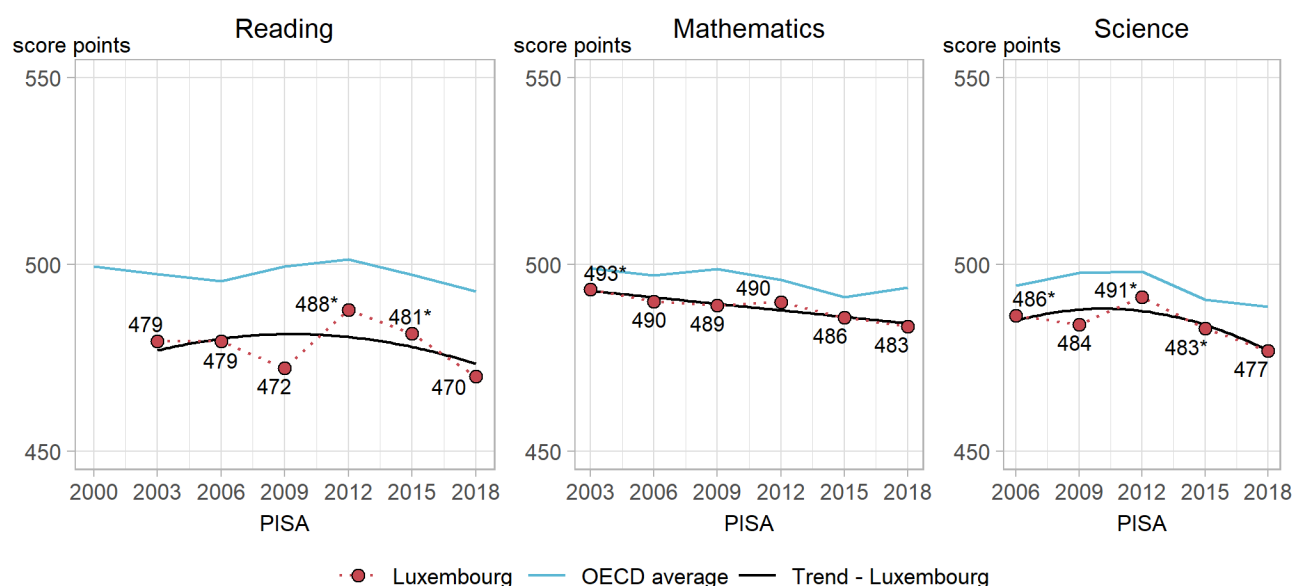
- Students in Luxembourg scored 483 points in mathematics in PISA 2018, slightly below the OECD average (489 score points). Luxembourg ranked between 25th and 29th in average mathematics performance, on a par with Hungary, Italy, Lithuania, the Russian Federation, the Slovak Republic, Spain and the United States.
- Some 73% of students in Luxembourg attained Level 2 or higher in mathematics (OECD average: 76%). 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 95% in Macao (China) to just 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.
- Some 11% of students scored at Level 5 or higher in mathematics. Six Asian countries and economies had the largest shares of students who did so: Beijing-Shanghai-Jiangsu-Zhejiang (China) (just over 44%), Singapore (nearly 37%), Hong Kong (China) (29%), Macao (China) (nearly 28%), Chinese Taipei (just over 23%) and Korea (just over 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***

- Students in Luxembourg scored 477 points in science in PISA 2018, slightly below the OECD average (489 score points). Luxembourg ranked between 27th and 29th in average performance in science, on a par with Croatia, Hungary, Iceland and the Russian Federation.
- Some 73% of students in Luxembourg attained Level 2 or higher in science (OECD average: 79%). 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.
- Some 5% of students were top performers in science, meaning that they were proficient at Level 5 or 6. 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 Luxembourg.

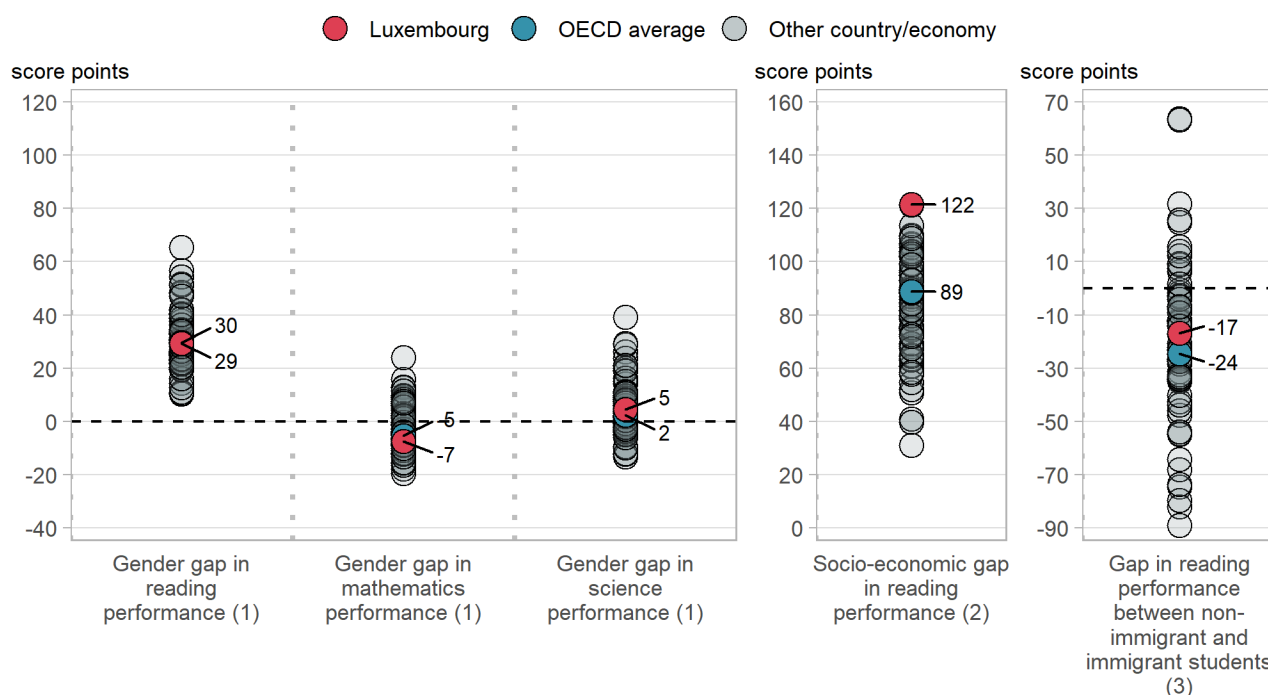
The blue line indicates the average mean performance across OECD countries with valid data in all PISA assessments. The red dotted line indicates mean performance in Luxembourg. The black line represents a trend line for Luxembourg (line of best fit).

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

- In Luxembourg, mean performance in mathematics declined by only 10 score points since 2003, but was but was close to its 2015 level. Mean performance in reading and science was lower in 2018 than in the most recent assessments (2012 and 2015): performance declined by 11 score points in reading and by 6 score points in science between 2015 and 2018.
- Between 2009 and 2018, the proportion of 15-year-old students with an immigrant background increased by 15 percentage points in Luxembourg – the largest increase amongst OECD countries. While immigrant students scored more than 30 points lower than non-immigrant students in reading, performance amongst immigrant students improved significantly between 2009 and 2018. The change in the proportions of immigrant and non-immigrant students could account for 5 points, at most, of the 18-point decline in mean reading scores over the 2012-18 period.
- The gap in performance between the highest- and lowest-achieving students in Luxembourg widened in both reading and mathematics since 2003. Larger shares of immigrant students likely contributed to this trend. It can be estimated that, if the student population in 2009 had had the same demographic characteristics as the student population in 2018, this gap in reading performance would not have widened between 2009 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 1 After accounting for students' and schools' socio-economic profile.

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

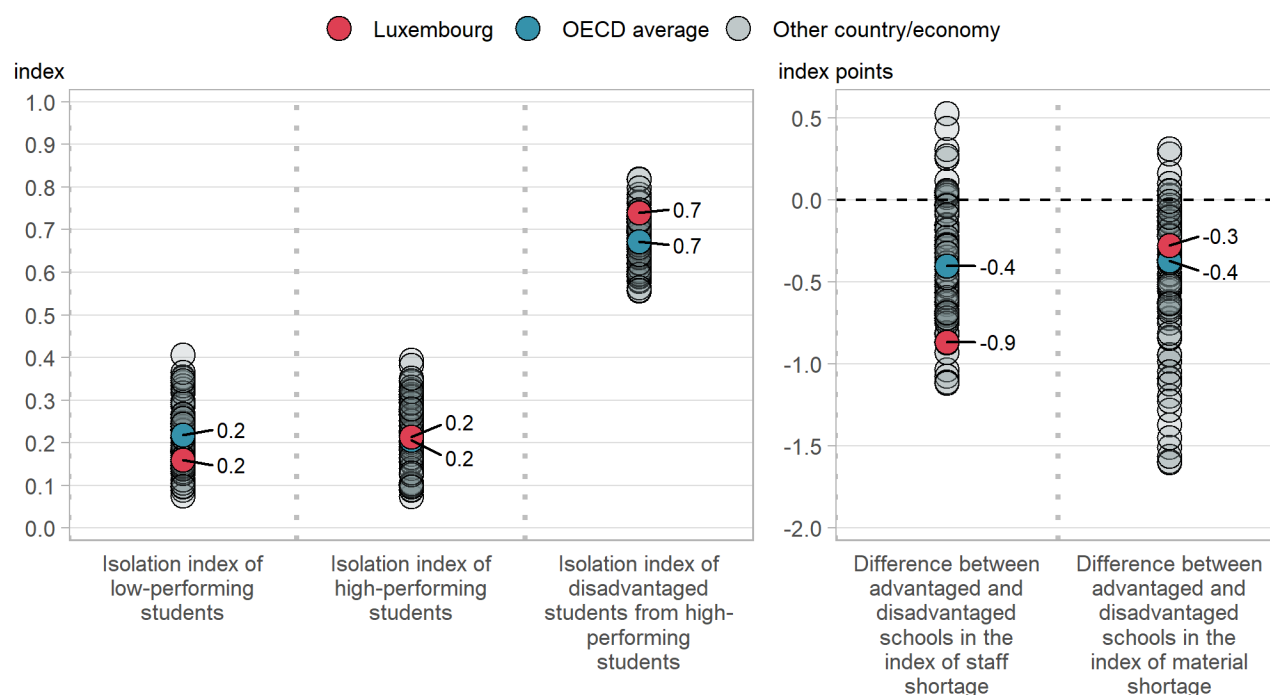
### Equity related to socio-economic status

- In Luxembourg, advantaged students outperformed disadvantaged students in reading by 122 score points in PISA 2018 (OECD average difference: 89 score points). This is the largest difference observed between these two groups amongst all PISA-participating countries and economies. Amongst OECD countries, only in Israel was a similarly large gap observed (121 score points). In Germany and Hungary, 113 score points separated these two groups, and in Belgium, the Czech Republic, France, the Slovak Republic and Switzerland, the difference amounted to more than 100 score points. In PISA 2009, the performance gap related to socio-economic status was 115 score points in Luxembourg (and 87 score points on average across OECD countries).
- Socio-economic status was also strongly linked with mathematics and science performance in Luxembourg. It predicted 19% of the variation in mathematics performance in PISA 2018 (compared to 14% on average across OECD countries), and 21% of the variation in science performance (compared to the OECD average of 13% of the variation).
- Some 18% of advantaged students in Luxembourg, but only 1% of disadvantaged students, were top performers in reading in PISA 2018, meaning that they attained at least Level 5 in reading. On average across OECD countries, 17% of advantaged students and 3% of disadvantaged students were top performers in reading.
- Some 8% of disadvantaged students in Luxembourg were able to score in the top quarter of reading performance. This is one of the smallest proportions observed amongst PISA-participating countries; only in Bulgaria, Peru and the United Arab Emirates were smaller proportions of “academically resilient” students observed. In Canada, Estonia, Ireland and the United Kingdom, all of which scored above the

OECD average, more than 13% of disadvantaged students scored amongst the highest performers in reading in their country (OECD average: 11%).

- In Luxembourg, low-performing students are less often clustered with other low performers, compared to the OECD average. However, a disadvantaged student has less than a one-in-seven chance of being enrolled in a school with students who score in the top quarter of reading performance (OECD average: a one-in-six chance). In Canada, Denmark, Estonia, Finland, Iceland, Ireland, Norway, Portugal and Sweden, for instance, disadvantaged students have a one-in-five chance of having high-achieving schoolmates.
- School principals in Luxembourg reported less material shortage, on average, but more staff shortage than the OECD average. Principals of disadvantaged schools were more likely to report staff shortages than principals of advantaged schools. In Luxembourg, 84% of students enrolled in a disadvantaged school and 50% of students enrolled in an advantaged school 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 Luxembourg, the proportion of teachers with at least a master's degree is greater in advantaged schools (85%) than in disadvantaged schools (75%).
- Many students, especially disadvantaged students, hold lower ambitions than would be expected given their academic achievement. In Luxembourg, about one in three high-achieving disadvantaged students – while only one in seven high-achieving advantaged students – does not expect to complete tertiary education.

**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.

***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, and by 29 score points in Luxembourg. The gender gap in reading in Luxembourg was narrower in 2018 than in 2009 (39 score points), although boys' performance remained stable over the period.
- Boys scored lower than girls in mathematics by seven score points in Luxembourg, a difference that is slightly larger than the average gender gap in mathematics performance across OECD countries (five score points). Girls outperformed boys in science by five score points in Luxembourg and by two score points on average across OECD countries.
- Amongst high-performing students in mathematics or science, one in four boys in Luxembourg expects to work as an engineer or science professional at the age of 30, while only about one in seven girls expects to do so. One in four high-performing girls in Luxembourg expects to work in health-related professions, while only one in ten high-performing boys expects so. Only 8% of boys and 1% of girls in Luxembourg expect to work in ICT-related professions.

***Equity related to immigrant background***

- In 2018, 55% of 15-year-old students in Luxembourg had an immigrant background, up from 40% in 2009. This is the largest increase observed amongst PISA-participating countries. Only in Canada, Qatar, Serbia, Switzerland and the United Kingdom did the share of immigrant students increase by more than 10 percentage points between 2009 and 2018. Amongst immigrant students in Luxembourg, three in eight were socio-economically disadvantaged, a proportion similar to the OECD average.
- The average difference in reading performance between immigrant and non-immigrant students in Luxembourg was 35 score points in favour of non-immigrant students (OECD average difference: 44 score points). The difference shrank to 17 score points after accounting for students' and schools' socio-economic profile (OECD average difference: 24 score points). Unlike what is observed in many PISA-participating countries, first-generation immigrant students in Luxembourg performed better in reading (461 score points) than second-generation immigrant students (450 score points). Non-immigrant students scored 491 score points.
- Even though immigrant students tend to be disadvantaged, some are able to attain academic excellence. Some 22% of immigrant students in Luxembourg scored in the top quarter of reading performance. Across OECD countries, only 17% of immigrant students performed at that level.



## What School Life Means for Students' Lives

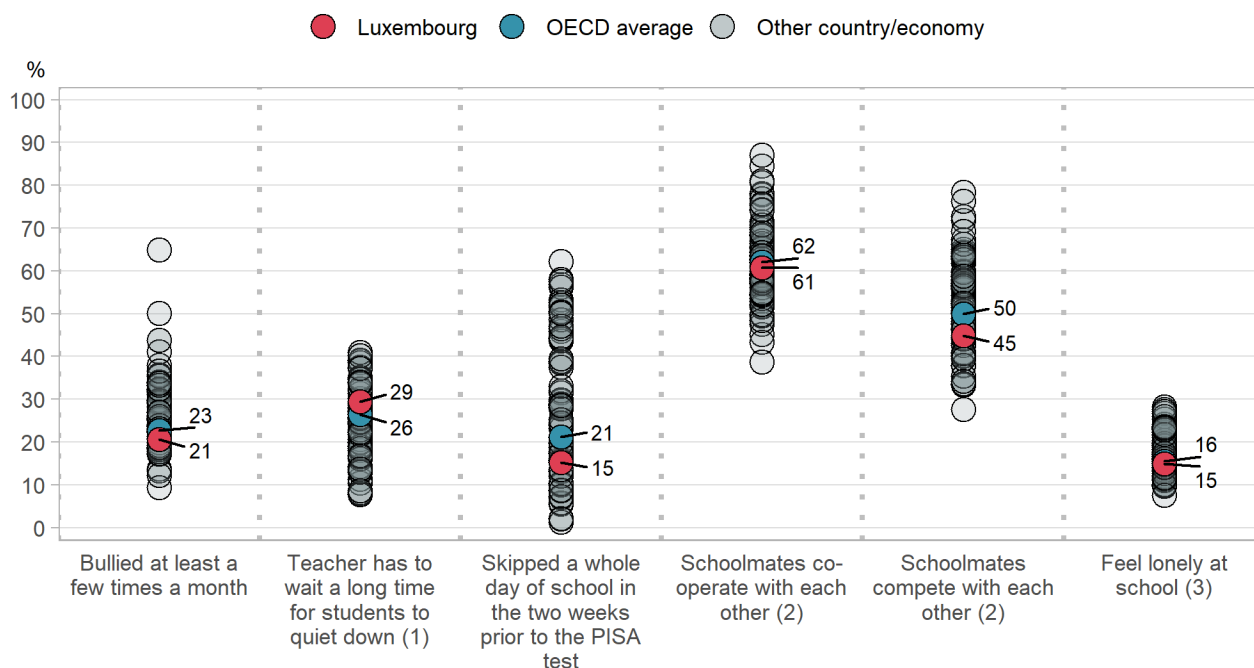
### *How is the school climate in Luxembourg?*

- In Luxembourg, 21% of students reported being bullied at least a few times a month, compared to 23% on average across OECD countries. Yet, 87% of students in Luxembourg (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 29% of students in Luxembourg (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 Luxembourg, students who reported that, in every or most lessons, the teacher has to wait a long time for students to quiet down scored 26 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 Luxembourg, 15% of students had skipped a day of school and 55% 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.
- Some 69% of students in Luxembourg (OECD average: 74%) agreed or strongly agreed that their teacher showed enjoyment in teaching. In most countries and economies, including in Luxembourg, students scored higher in reading when they perceived their teacher as more enthusiastic, especially when students said their teachers were interested in the subject.
- In Luxembourg, 61% of students reported that their schoolmates co-operate with each other (OECD average: 62%) and 45% reported that they compete with each other (OECD average: 50%).
- Only one in six students in Luxembourg agreed or strongly agreed that they feel lonely at school and one in five agreed or strongly agreed that they feel like an outsider at school, proportions that are similar to the OECD averages. However, immigrant students in Luxembourg were more likely to report that they feel like an outsider at school (21%, compared to the OECD average of 23%) compared to non-immigrant students (25%, compared to the OECD average of 21%).

### *Are parents involved in school activities in Luxembourg?*

- According to school principals in Luxembourg, about 38% of students' parents discussed their child's progress with a teacher on their own initiative (OECD average: 41%) and 48% did so on the initiative of teachers (OECD average: 57%). Only 6% of parents in Luxembourg participated in local school government and 6% volunteered for physical or extracurricular activities – proportions significantly smaller than the OECD averages (17% participated in local school government and 12% volunteered).
- When asked about the factors that hinder their participation in school activities, parents in Luxembourg commonly cited obstacles that were time-related, such as the need to work (28%) and the inconvenience of meeting times (29%).

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, Table III.B1.2., Table III.B1.3.1, Table III.B1.4.1, Table III.B1.8.1, Table III.B1.8.2, Table III.B1.9.1

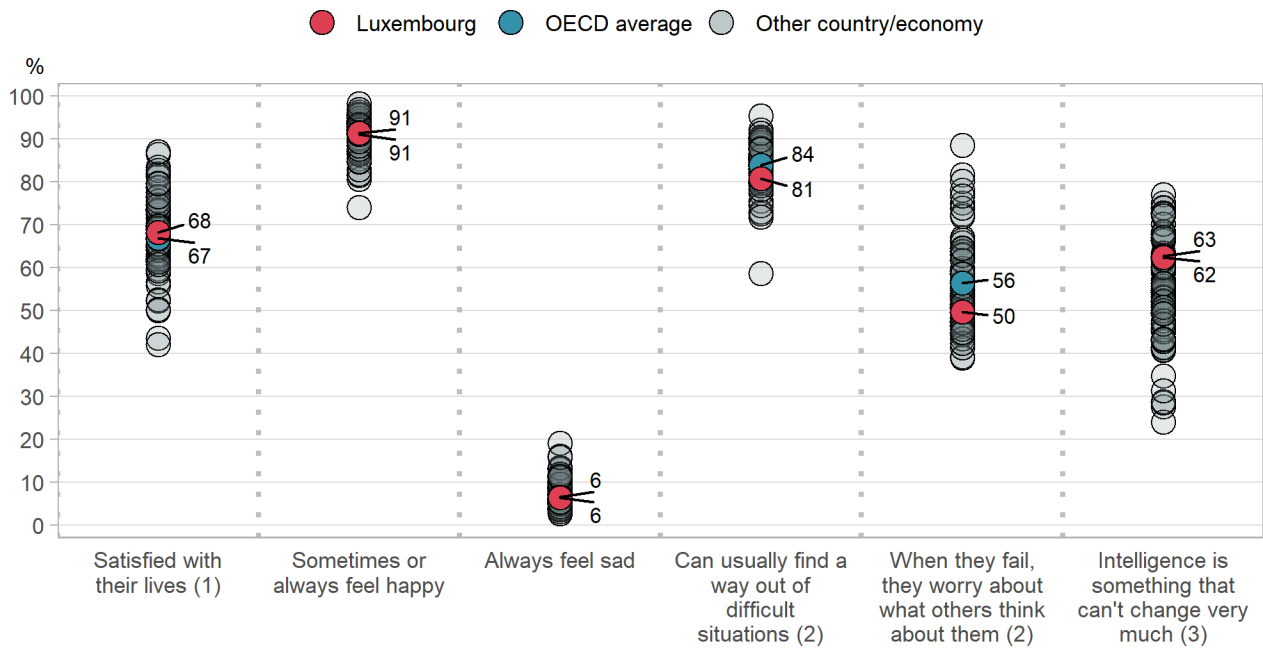
### How do students in Luxembourg feel about their lives?

- In Luxembourg, 68% 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). However, immigrant students in Luxembourg were less likely to report that they are very satisfied with their lives (65%, compared to OECD average of 64%) compared to non-immigrant students who so reported (72%, compared to OECD average of 68%).
- Some 91% of students in Luxembourg reported sometimes or always feeling happy and about 6% of students reported always feeling sad. In most countries and economies, including Luxembourg, 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 Luxembourg, 81% of students agreed or strongly agreed that they can usually find a way out of difficult situations (OECD average: 84%), and 50% agreed or strongly agreed that, when they fail, they worry about what others think about them (OECD average: 56% of students). In almost every education system, including Luxembourg, girls expressed greater fear of failure than boys, and this gender gap was considerably wider amongst top-performing students.

### Do students in Luxembourg hold a growth mindset?

- In Luxembourg, 62% of students hold a growth mindset (they disagreed or strongly disagreed with the statement "Your intelligence is something about you that you can't change very much"), on a par with the average proportion across OECD countries.
- On average across OECD countries, having a growth mindset was positively associated with students' motivation to master tasks, general self-efficacy, setting learning goals and perceiving the value of school.

Figure 6. Student well-being and growth mindset



Note: 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, Table III.B1.11.1, Table III.B1.12.1, Table III.B1.12.2, Table III.B1.13.1, Table III.B1.13.2, Table 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, Luxembourg did not participate in the assessment of global competence. PISA 2018 also included an assessment of young people's financial literacy, which was optional for countries and economies. 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 Luxembourg, 5 230 students, in 44 schools, completed the assessment, representing 5 478 15-year-old students (87% 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.

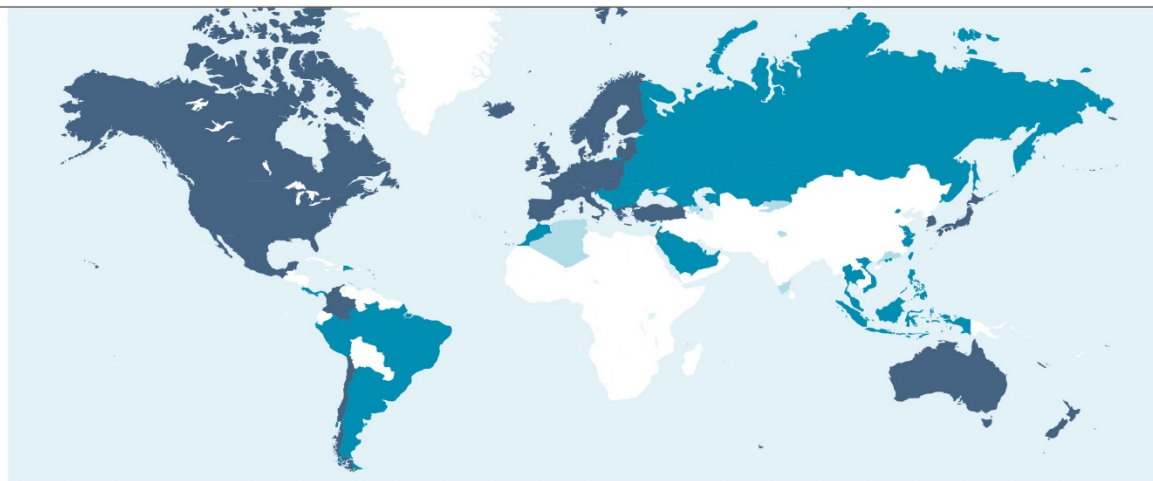
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OECD (2019), *PISA 2018 Results (Volume III): What School Life Means for Students' Lives*, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/acd78851-en>

## 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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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>

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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