

PISA

PISA 2022 Results

Factsheets

Denmark



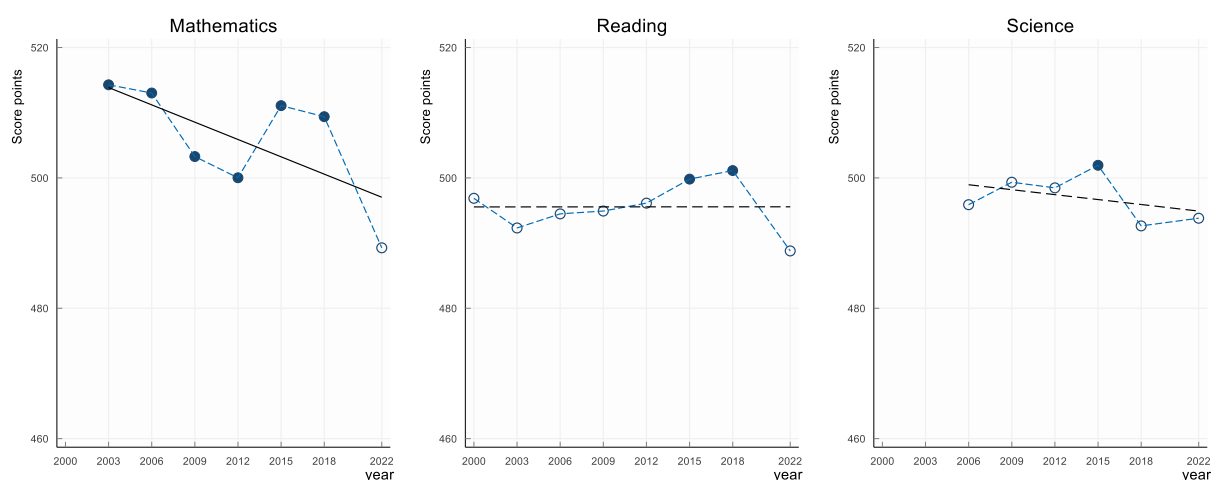
Denmark

The Programme for International Student Assessment (PISA) assesses the knowledge and skills of 15-year-old students in mathematics, reading and science. The tests explore how well students can solve complex problems, think critically and communicate effectively. This gives insights into how well education systems are preparing students for real life challenges and future success. Denmark participated for the first time in PISA in 2000. By comparing results internationally, policy makers and educators in Denmark can learn from other countries' policies and practices.

How well did 15-year-old students in Denmark do on the test?

Trends in mathematics, reading and science performance

Figure 1. Trends in performance in mathematics, reading and science



Note: White dots indicate mean-performance estimates that are not statistically significantly above/below PISA 2022 estimates. Black lines indicate the best-fitting trend. An interactive version of this figure is available at <https://oecdch.art/a40de1dbaf/C497>.
Source: OECD, PISA 2022 Database, Tables I.B1.5.4, I.B1.5.5 and I.B1.5.6.

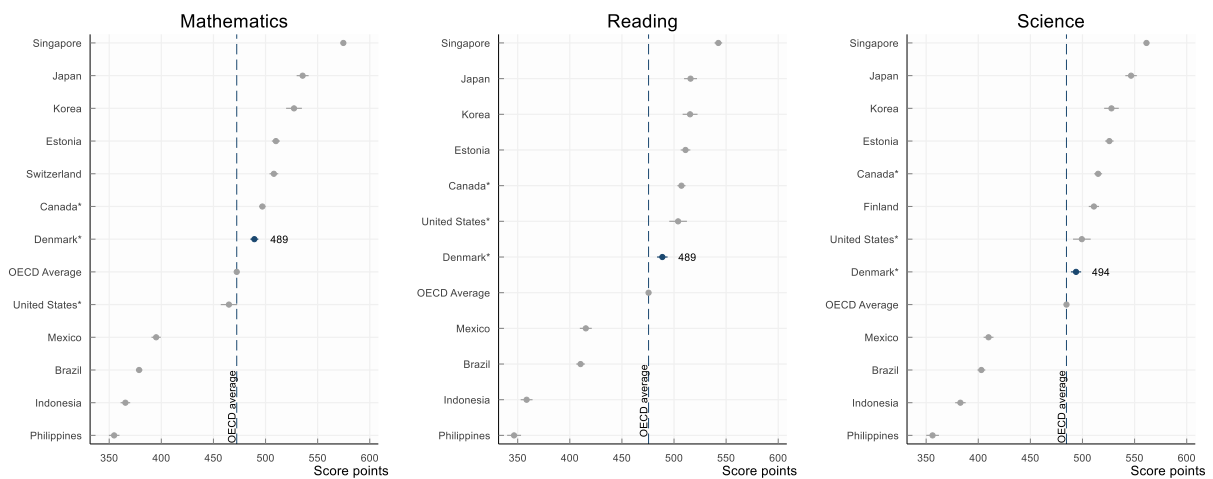
- Average 2022 results were down compared to 2018 in mathematics and reading, and about the same as in 2018 in science.
- In mathematics, average performance was lower in 2022 than in any previous assessment: the recovery reported in 2015 and 2018 turned out to be a fragile one, and was erased by the more recent drop. The overall trend, including 2022, is declining. In reading and science, average scores were close to those observed in the first PISA assessments, up to 2012. The overall trend in these two subjects is flat (neither improving, nor declining).

- Over the most recent period (2018 to 2022), the gap between the highest-scoring students (10% with the highest scores) and the weakest students (10% with the lowest scores) did not change significantly in mathematics, reading and science. In mathematics, performance dropped to a similar extent for both high- and low-achievers.
- Compared to 2012 the proportion of students scoring below a baseline level of proficiency (Level 2) increased by three percentage points in mathematics; increased by four percentage points in reading; and did not change significantly in science.

How does Denmark compare?

Figure 2. Mean performance in mathematics, reading and science in PISA 2022

Denmark, OECD average and selected comparison countries



Notes: Comparison countries include the six highest-performing countries in each subject and the five countries with the largest population of 15-year-old students.

Horizontal lines that extend beyond the markers represent a measure of uncertainty associated with mean estimates (the 95% confidence interval).

Source: OECD, PISA 2022 Database, Tables I.B1.2.1, I.B1.2.2 and I.B1.2.3.

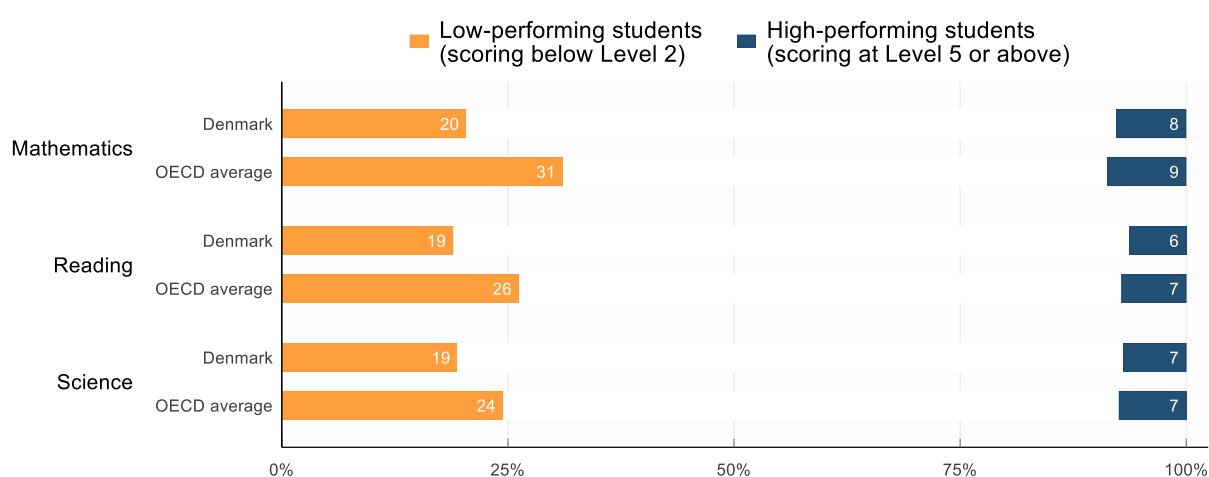
- Students in Denmark scored higher than the OECD average in mathematics, reading and science.
- A similar number of students in Denmark, to the average across OECD countries, were top performers (Level 5 or 6) in at least one subject. At the same time a larger proportion of students than on average across OECD countries achieved a minimum level of proficiency (Level 2 or higher) in all three subjects.

What students know and can do in mathematics

- In Denmark, 80% of students attained at least Level 2 proficiency in mathematics, significantly more than on average across OECD countries (OECD average: 69%). At a minimum, these students can interpret and recognize, 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). Over 85% of students in Singapore, Macao (China), Japan, Hong Kong (China)*, Chinese Taipei and Estonia (in descending order of that share) performed at this level or above.

- Some 8% of students in Denmark were top performers in mathematics, meaning that they attained Level 5 or 6 in the PISA mathematics test (OECD average: 9%). Six Asian countries and economies had the largest shares of students who did so: Singapore (41%), Chinese Taipei (32%), Macao (China) (29%), Hong Kong (China)* (27%), Japan (23%) and Korea (23%). At these levels, students can model complex situations mathematically, and can select, compare and evaluate appropriate problem-solving strategies for dealing with them. Only in 16 out of 81 countries and economies participating in PISA 2022 did more than 10% of students attain Level 5 or 6 proficiency.

Figure 3. Top performers and low-performing students in mathematics, reading and science



Note: Numbers inside the figure correspond to percentages.

Source: OECD, PISA 2022 Database, Tables I.B1.3.1, I.B1.3.2 and I.B1.3.3.

What students know and can do in reading

- Some 81% of students in Denmark attained Level 2 or higher in reading (OECD average: 74%). 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. The share of 15-year-old students who attained minimum levels of proficiency in reading (Level 2 or higher) varied from 89% in Singapore to 8% in Cambodia.
- In Denmark, 6% of students scored at Level 5 or higher in reading (OECD average: 7%). These 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.

What students know and can do in science

- Some 81% of students in Denmark attained Level 2 or higher in science (OECD average: 76%). At a minimum, these students can recognize 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 Denmark, 7% 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.

A special edition of PISA

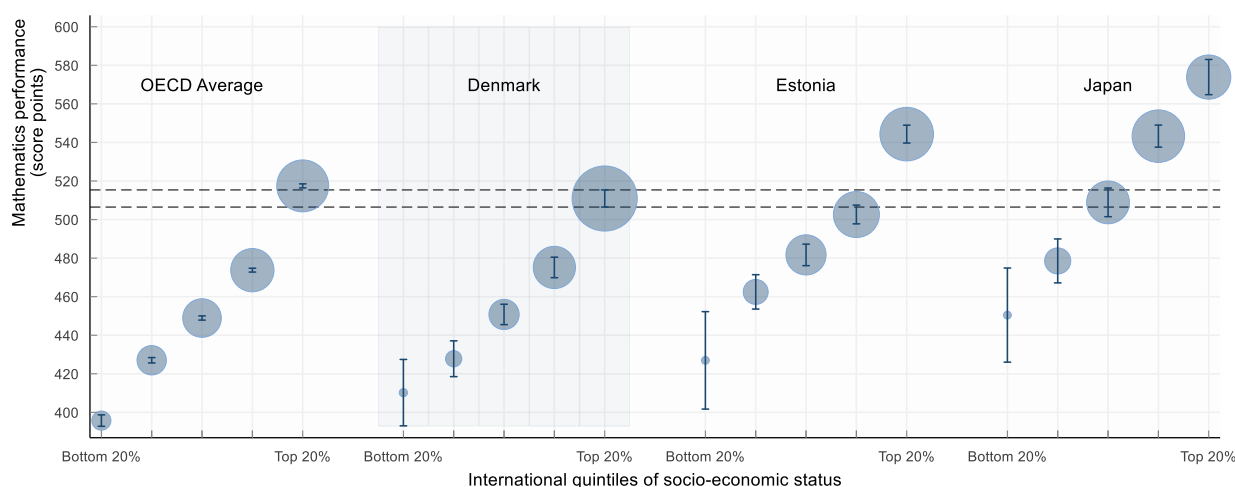
This PISA test was originally due to be conducted in 2021 but was delayed by one year because of the COVID-19 pandemic. The exceptional circumstances throughout this period, including lockdowns and school closures in many countries, led to occasional difficulties in collecting some data. While the vast majority of countries and economies met PISA's technical standards, a small number did not. A country or economy in this note with an asterisk (*) next to its name means that caution is required when interpreting estimates because one or more PISA sampling standards were not reached. Further information can be found in the Reader's Guide and in Annexes A2 and A4 of the main report.

In Denmark, more students were excluded from the sample in comparison to 2018, surpassing the limit set by PISA technical standards. Most of these students were excluded because they were dyslexic, and are usually allowed to use electronic assistive devices to help them read on screens, including during exams. The lack of such an accommodation in PISA led schools to exclude many of these students.

Performance gaps within Denmark

Socio-economic divides

Figure 4. Mean performance in mathematics, by international quintiles of socio-economic status



Note: The size of markers is proportional to the share of the student population within each quintile of socio-economic status (as determined by the PISA index of economic, social and cultural status, ESCS). Quintiles are defined at the international level, to include 20% of PISA participants in each quintile; within each national sample, the proportion can therefore differ from 20%.

Vertical bars that extend beyond the markers represent a measure of uncertainty associated with each estimate (the 95% confidence interval). Horizontal, dashed lines represent the uncertainty associated with the mean score of the largest group of students (as defined by international quintiles) within Denmark.

Source: OECD, PISA 2022 Database, Tables I.B1.4.6 and I.B1.4.8.

- The PISA index of economic, social and cultural status is computed in such a way that all students taking the PISA test, regardless of the country where they live, can be placed on the same socio-economic scale. This means that it is possible to use this index to compare the performance of

students of similar socio-economic background in different countries. In Denmark, 59% of students (the largest share) were in the top international quintile of the socio-economic scale, meaning that they were among the most advantaged students who took the PISA test in 2022. Their average score in mathematics was 511 score points. In Estonia and Japan, students of similar socio-economic background tend to score significantly higher.

- The PISA index of economic, social and cultural status can also be used to order students from the most disadvantaged to the most advantaged within each country and economy, and to create four groups of students of equal size (each comprising 25% of the population of 15-year-old students in each country/economy). In Denmark socio-economically advantaged students (the top 25% in terms of socio-economic status) outperformed disadvantaged students (the bottom 25%) by 74 score points in mathematics. This is smaller than the average difference between the two groups (93 score points) across OECD countries.
- Between 2012 and 2022, the gap in mathematics performance between the top and the bottom 25% of students in terms of socio-economic status narrowed in Denmark, while the average gap across OECD countries remained stable.
- Socio-economic status was a predictor of performance in mathematics in all PISA participating countries and economies. It accounted for 12% of the variation in mathematics performance in PISA 2022 in Denmark (compared to 15% on average across OECD countries).
- Some 10% of disadvantaged students in Denmark were able to score in the top quarter of mathematics performance. These students can be considered academically resilient because, despite their socio-economic disadvantage, they have attained educational excellence by comparison with students in their own country. On average across OECD countries, 10% of disadvantaged students scored in the top quarter of mathematics performance in their own countries.

Gender differences in performance

- Boys outperformed girls in mathematics by 12 score points; girls outperformed boys in reading by 21 score points in Denmark. Globally, in mathematics, boys outperformed girls in 40 countries and economies, girls outperformed boys in another 17 countries or economies, and no significant difference was found in the remaining 24. In reading, girls, on average, scored above boys in all but two countries and economies that participated in PISA 2022 (79 out of 81).
- In Denmark, the share of low performers is similar among boys (20%) and girls (21%) in mathematics; in reading, however, the share is larger among boys (15% of girls and 23% of boys scored below Level 2 in reading). When it comes to top performers, the share is larger among boys (10%) than among girls (5%) in mathematics; in reading, however, the share is similar among girls (7% of girls and 6% of boys scored at Level 5 or 6 in reading).
- Between 2012 and 2022, performance in mathematics declined to a similar extent among boys and girls in Denmark.

Immigrant background and student performance

- Immigrant students are defined as students whose parents were born in a country/economy other than that where the student took the PISA test. Students with an immigrant background can be distinguished between first- and second-generation immigrants. First-generation immigrants are those who were also born outside the country of assessment; second-generation students are students born in the country of assessment but whose parent(s) were born outside the country of assessment.

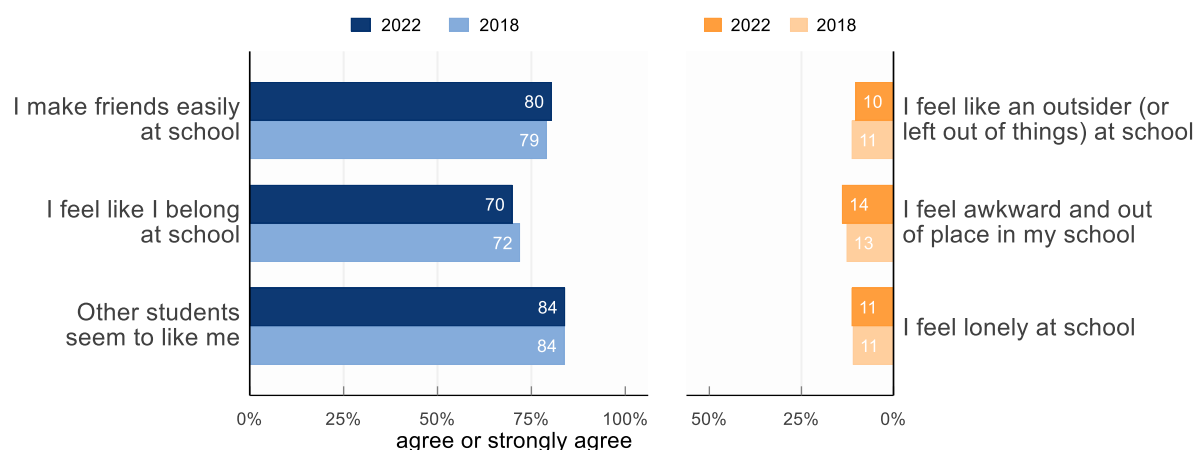
- The share of immigrant students has increased in Denmark to 11% in 2022 (9% in 2012). In 2022, 4% of 15-year-old students were first-generation immigrants, meaning that they were born in another country/economy, and their families moved to Denmark only in recent years. Among these first-generation immigrant students, 39% arrived in Denmark at or before age 5; 16% arrived after age 12, and after completing the elementary grades in another education system.
- Immigrant students in Denmark tend to have a more disadvantaged socio-economic profile than non-immigrant students; while 25% of all students are considered socio-economically disadvantaged, the corresponding share among students with an immigrant background is 56%. Some 56% of immigrant students (and 3% of all remaining students) reported that the language they speak at home most of the time is different from the language in which they took the PISA assessment.
- In mathematics, the average difference in performance between immigrant and non-immigrant students was 54 score points in favour of non-immigrant students, a significant difference. After accounting for students' socio-economic profile, a significant difference of 28 score points in favour of non-immigrant students was observed.
- In reading, the average difference in performance between immigrant and non-immigrant students was 63 score points in favour of non-immigrant students, a significant difference. After accounting for students' socio-economic profile, a significant difference of 37 score points in favour of non-immigrant students was observed.

How is school life in Denmark?

Students' sense of belonging at school and satisfaction with life

- In 2022, 80% of students in Denmark reported that they make friends easily at school (OECD average: 76%) and 70% felt that they belong at school (OECD average: 75%). Meanwhile, 11% reported feeling lonely at school, and 10% like an outsider or left out of things at school (OECD average: 16% and 17%).
- Students' satisfaction with life, more generally, declined in many countries and economies over recent years. In 2022, 11% of students in Denmark reported that they were not satisfied with their lives: they rated their satisfaction with life between 0 and 4 on a scale ranging from 0 to 10.

Figure 5. Students' sense of belonging at school



Note: Numbers inside the figure correspond to percentages.
Source: OECD, PISA 2022 Database, Table II.B1.1.4.

Support and discipline in mathematics lessons

- In Denmark, 65% of students reported that, in most mathematics lessons, the teacher shows an interest in every student's learning (OECD average: 63%), and 72% that the teacher gives extra help when students need it (OECD average: 70%). In 2012, the corresponding shares were 66% and 74%. Mathematics results in 2022 tended to decline less, on average, in education systems where more students reported that teachers give extra help when students need it, compared to ten years earlier.
- Some students study mathematics in a disciplinary climate that is not favourable to learning: in 2022, about 18% of students in Denmark reported that they cannot work well in most or all lessons (OECD average: 23%); 22% of students do not listen to what the teacher says (OECD average: 30%); 32% of students get distracted using digital devices (OECD average: 30%); and 25% get distracted by other students who are using digital devices (OECD average: 25%). On average across OECD countries, students were less likely to report getting distracted using digital devices when the use of cell phones on school premises is banned.

Feeling safe at and around school

- PISA 2022 data show that in education systems where performance remained high and students' sense of belonging improved, students tended to feel safer and less exposed to bullying and other risks at their school.
- Some 23% of girls and 23% of boys reported being the victim of bullying acts at least a few times a month (OECD average: 20% of girls and 21% of boys). On average across OECD countries, fewer students were exposed to bullying in 2022 compared to 2018: for example, only 7% of students reported that other students spread nasty rumours about them in 2022, compared to 11% in 2018. In Denmark, too, the corresponding proportions shrank (6% in 2022 compared to 7% in 2018).

Parental involvement in learning

- PISA data collected from school principals show that the percentage of parents who were involved in school and learning decreased substantially between 2018 and 2022 in many countries/economies. This was also the case in Denmark. In 2022, 23% of students in Denmark were in schools whose principal reported that during the previous academic year at least half of all families discussed their child's progress with a teacher on their own initiative (and 81% on the teacher's initiative). In 2018, the corresponding number was 32% (and 88%). Systems that had more positive trends in parental involvement between 2018 and 2022 (i.e. systems in which the share of parents who discussed their child's progress with a teacher on their own initiative shrank less) tended to show more stable or improved performance in mathematics.

What else does PISA tell us?

Resources invested in education

- Expenditure on education is related to student performance only to a certain extent. Among the countries/economies whose cumulative expenditure per student, over all primary and secondary school years between the ages of 6 and 15, was under USD 75 000 (PPP) in 2019, higher

expenditure on education was associated with higher scores in the PISA mathematics test. But this was not the case among countries/economies whose cumulative expenditure was greater than USD 75 000 (PPP). For this latter group of countries/economies, the ways in which financial resources are used seems to matter more for student performance than the level of investment in education. In Denmark, the cumulative expenditure per student, over ten years of age between 6 and 15, was equivalent to about USD 130 700 (PPP).

- In about half of all countries/economies with comparable data, school principals in 2022 were more likely than their counterparts in 2018 to report a shortage of teaching staff. This was also the case in Denmark. In 2022, 10% of students in Denmark were in schools whose principal reported that the school's capacity to provide instruction is hindered by a lack of teaching staff (and 6%, by inadequate or poorly qualified teaching staff). In 2018, the corresponding proportions were 5% and 2%. In most countries/economies, students attending schools whose principal reported shortages of teaching staff scored lower in mathematics than students in schools whose principal reported fewer or no shortages of teaching staff.

How students progress through schooling

- When they sat the PISA test in 2022, 91% of 15-year-old students in Denmark were enrolled in 9th grade.
- In Denmark, 98% reported that they had attended pre-primary education for one year or more (OECD average: 94%). On average across OECD countries, students who had attended pre-primary education for one year or more scored higher in mathematics at the age of 15 than students who never attended or who had attended for less than one year, even after accounting for socio-economic factors.
- Some 3% of students in Denmark reported that they had repeated a grade at least once (OECD average: 9%) after entering primary school. Grade repetition tends to be less prevalent in high performing systems.

School autonomy

- In Denmark, 83% of students attended a school where principals had the main responsibility for hiring teachers (OECD average: 60%), and 83% were enrolled in a school where teachers had the main responsibility for choosing which learning materials are used (OECD average: 76%). Many high-performing school systems tend to entrust principals and teachers with these responsibilities.

Key features of PISA 2022

The content

- The PISA 2022 survey focused on mathematics, with reading and science as minor areas and creative thinking as the innovative area of assessment. PISA 2022 also included an assessment of young people's financial literacy, which was optional for countries and economies. Results for mathematics, reading and science are released on 5 December 2023 and results for creative thinking and financial literacy in 2024.

The students

- Some 690 000 students took the assessment in 2022, representing about 29 million 15-year-olds in the schools of the 81 participating countries and economies.

- In Denmark, 6200 students, in 347 schools, completed the assessment in mathematics, reading or science, representing about 56 900 15-year-old students (an estimated 84% of the total population of 15-year-olds).

The assessment

- Students took two hour-long tests, each devoted to one subject. Different students were given different test questions and different combinations of subjects (e.g. mathematics followed by reading, or science followed by mathematics, etc.). Test items were a mixture of multiple-choice questions and questions requiring students to construct their own responses.
- 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 about school management, organisation, and the learning environment.
- Some countries/economies also distributed additional questionnaires, to students, parents and/or teachers, to elicit more information. The findings from these optional questionnaires are not covered by this note.

References

OECD (2023), PISA 2022 Results (Volume I): The State of Learning and Equity in Education, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/53f23881-en>

OECD (2023), PISA 2022 Results (Volume II): Learning During – and From – Disruption, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/a97db61c-en>

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