

# PISA 22

FIRST RESULTS



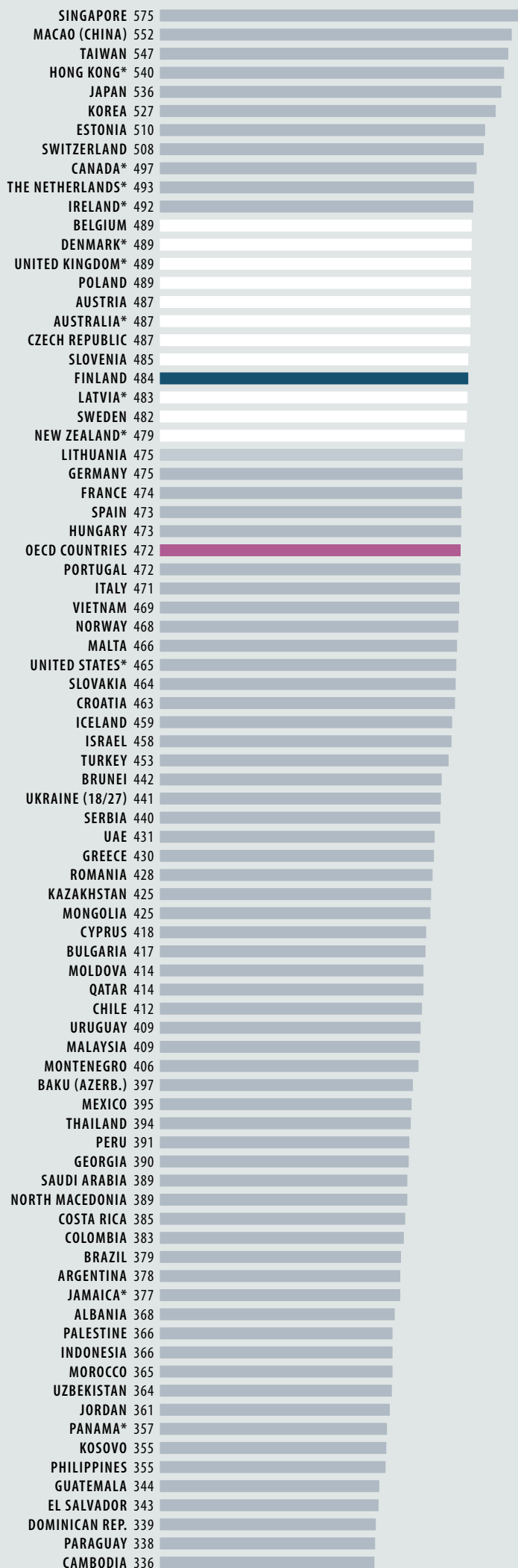
## Mean scores in mathematical literacy 2022

Countries with mean scores similar to Finland's are shown on white background  
\*Data did not meet all PISA standards

The eighth round of PISA (Programme for International Student Assessment) took place in 2022. For the third time, the main domain of assessment was mathematical literacy.

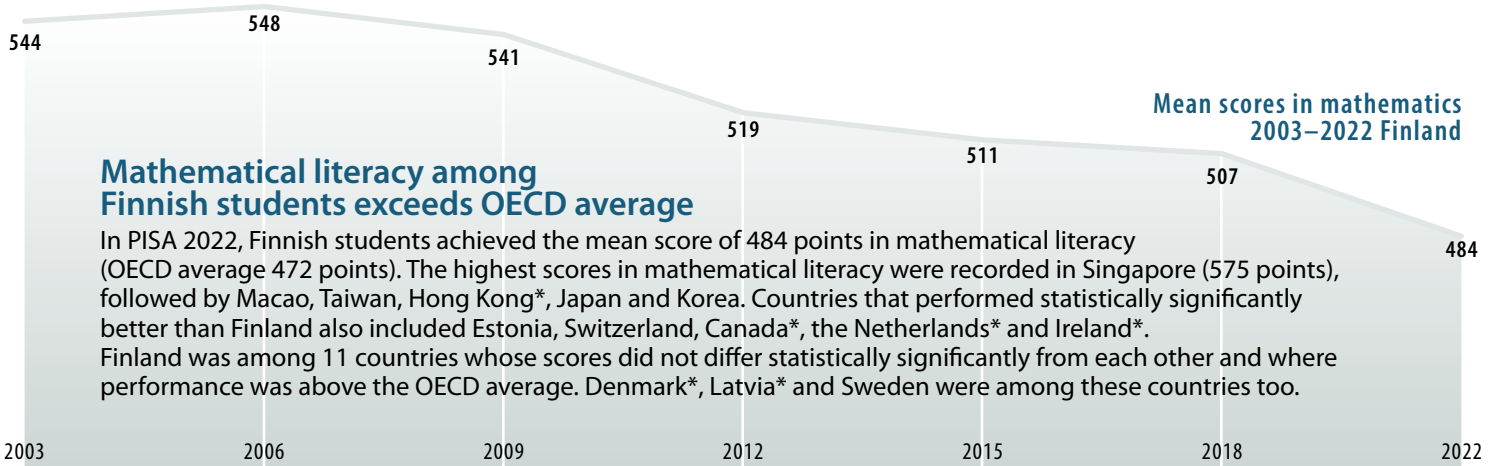
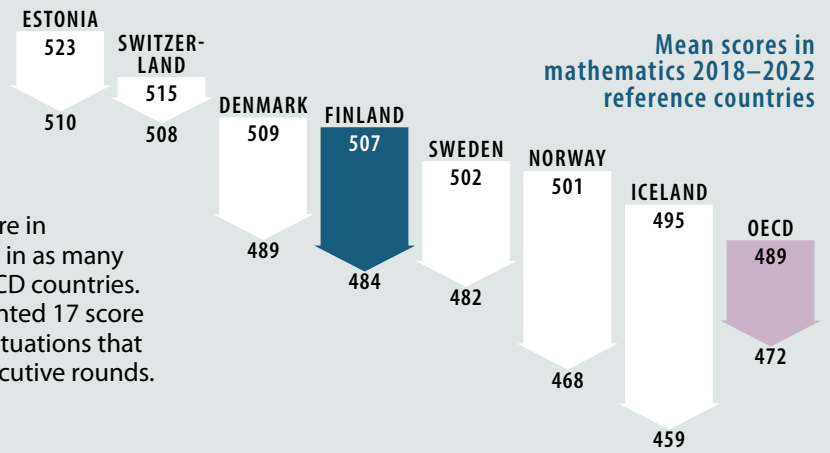
The assessments were planned to take place in 2021 but the COVID-19 pandemic, which began in 2020, forced them to be postponed by a year. Most of the 15-year-olds who took the tests were in year 7 of lower secondary school when the pandemic started and by the time PISA took place in spring 2022 they were in year 9, the final grade level of the Finnish comprehensive school education. The pandemic therefore shaped the last school years of the students who took part in the survey.

It was also exceptional how, for the first time, many countries struggled to meet the PISA standards for sampling or response rate. In twelve participating countries, the rate of student exclusion from the tests was too high or the student response rate or the school participation rate was too low. These countries were included in the international comparisons but their results should be treated with a certain degree of circumspection. They are marked with an asterisk (\*) in the reports.



## Unprecedented PISA round – performance fell in most OECD countries

Across comparable countries, the mean point score in mathematical literacy fell statistically significantly in as many as 41 countries or economies, of which 35 are OECD countries. The drop in the OECD average was an unprecedented 17 score points, standing in sharp contrast with earlier fluctuations that only amounted to 4 points or less between consecutive rounds. In Finland, the mean score dropped by 23 points.



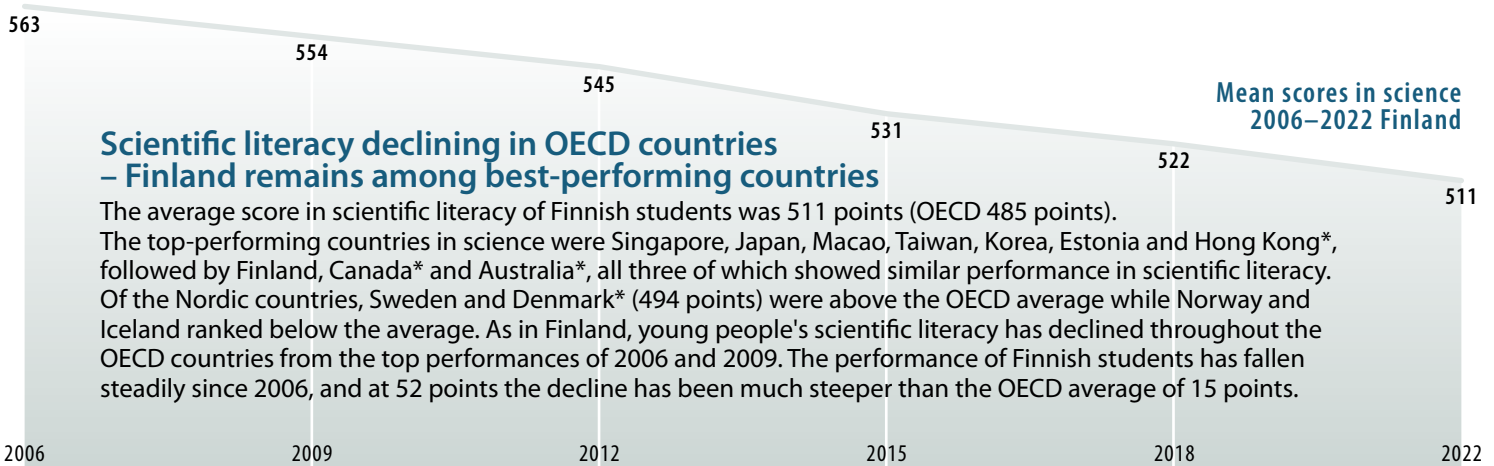
## Mathematical literacy among Finnish students exceeds OECD average

In PISA 2022, Finnish students achieved the mean score of 484 points in mathematical literacy (OECD average 472 points). The highest scores in mathematical literacy were recorded in Singapore (575 points), followed by Macao, Taiwan, Hong Kong\*, Japan and Korea. Countries that performed statistically significantly better than Finland also included Estonia, Switzerland, Canada\*, the Netherlands\* and Ireland\*. Finland was among 11 countries whose scores did not differ statistically significantly from each other and where performance was above the OECD average. Denmark\*, Latvia\* and Sweden were among these countries too.



## Sharp decline in reading literacy

In literacy, Finnish students continued to outperform (490 points) the OECD average (476 points). The highest-ranking countries were Singapore, Ireland\*, Japan, Korea, Taiwan and Estonia. The countries statistically on a par with Finland were the United Kingdom\*, Denmark\*, Poland, Czech Republic and Sweden. All of them performed better than the OECD average. Of the Nordic countries, the weakest performers were Norway and Iceland. In reading literacy, the main domain in PISA 2018, Finland's average score dropped markedly from the previous assessment, down by 30 points. Reading performance fell in most countries, declining statistically significantly in 39 countries and improving in 7 countries. In 2022 the OECD average fell by 11 points relative to the 2018 round, whereas changes in the OECD averages between earlier PISA rounds have been small, ranging around 2 to 5 points.



## Scientific literacy declining in OECD countries – Finland remains among best-performing countries

The average score in scientific literacy of Finnish students was 511 points (OECD 485 points). The top-performing countries in science were Singapore, Japan, Macao, Taiwan, Korea, Estonia and Hong Kong\*, followed by Finland, Canada\* and Australia\*, all three of which showed similar performance in scientific literacy. Of the Nordic countries, Sweden and Denmark\* (494 points) were above the OECD average while Norway and Iceland ranked below the average. As in Finland, young people's scientific literacy has declined throughout the OECD countries from the top performances of 2006 and 2009. The performance of Finnish students has fallen steadily since 2006, and at 52 points the decline has been much steeper than the OECD average of 15 points.

### Percentage of high and low performers in mathematics Finland 2003 and 2022

■ Excellent (Levels 5 and 6)  
■ Poor (below Level 2)

23.4%

8.5%

6.8%

24.9%

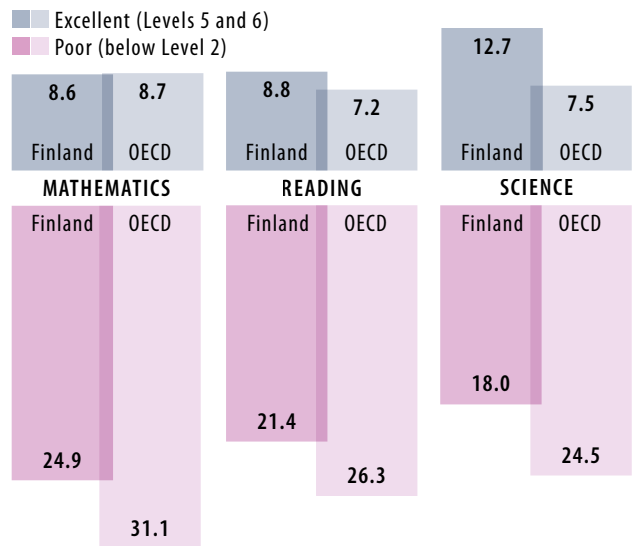
2003

2022

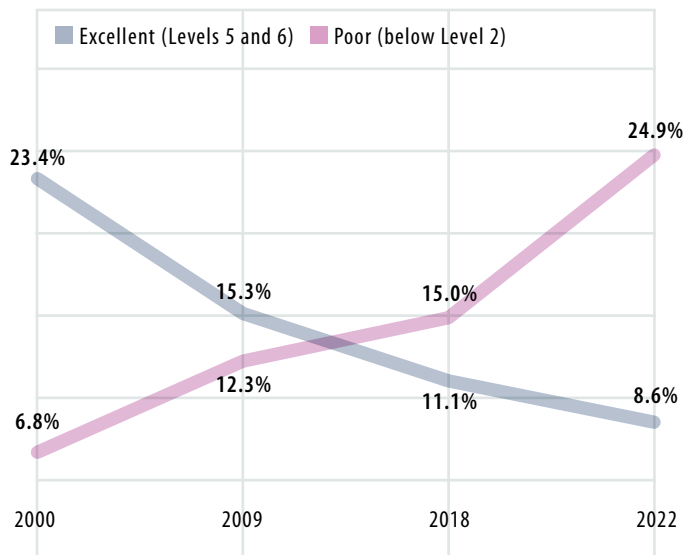
### Fewer top performers and more low-performing students

Finland tended to score high in the PISA assessments, especially in the early years when the survey was first launched. However, mathematical literacy in Finland has been on a downward trajectory since PISA 2006. In the latest assessment, the average score of Finnish students was 484 points, representing a sharp drop of 64 points from 2006 (548 points). This decline in performance is also evident in student distribution across different performance levels. In the early 2000s, less than 7 per cent of Finnish students ranked at the lowest performance levels (below Level 2) in mathematics. In contrast, in the latest study one in four students performed at these levels and the percentage of top-performing students in mathematical literacy (Level 5 or 6) fell over the same time period. While nearly one in four students in Finland performed at the highest proficiency levels in mathematical literacy in 2003, the share of top-performing students plummeted to less than 9 per cent in the 2022 assessment.

### Percentage of high and low performers Finland and OECD countries 2022 (%)



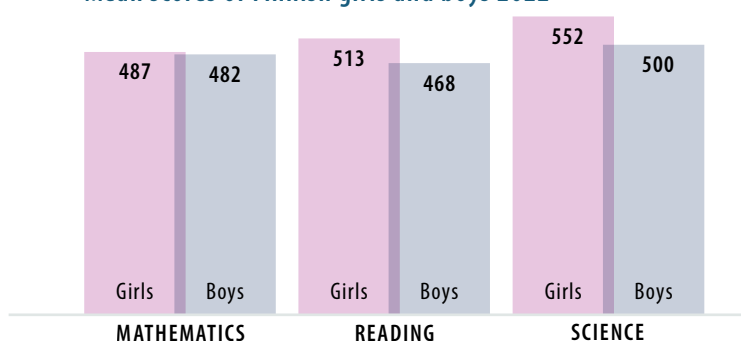
### Percentage of high and low performers in mathematics Finland 2000–2022 (%)



## Girls outperformed boys

In the PISA assessments of mathematical literacy, the performance gap between Finnish girls and boys has been fairly modest. In 2006, boys outperformed girls by 12 points. However, since 2015 girls have been achieving higher average scores than boys. In the 2022 assessment, the difference in performance between girls (487 points) and boys (482 points) was 5 points. This made Finland the only OECD country where the gender gap was statistically significant in favour of girls. The deterioration in performance, however, is evenly distributed: relative to the previous round in 2018, the average score in mathematical literacy fell by 24 points among Finnish girls and by 23 points among boys, with a similar trend continuing over a whole decade. The mean score for girls fell by 33 points and that for boys by 35 points. In reading literacy, the gender gap has consistently been high in Finland. In the 2022 survey, the gap narrowed from 52 points to 45 points, explained by the sharper decline in the girls' mean score. In scientific literacy, the score for girls was 522 points and for boys it was 500 points. This gap of 22 points in favour of girls was the widest in the OECD countries.

### Mean scores of Finnish girls and boys 2022



## Link between socio-economic status and mathematics performance at OECD average

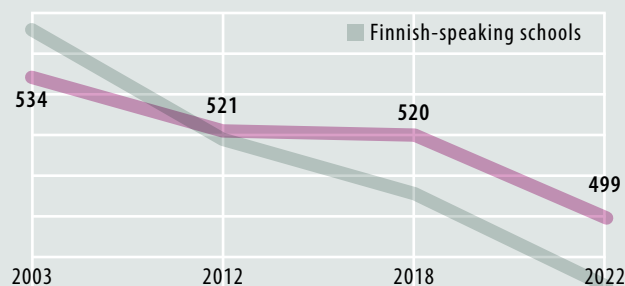
The educational background and occupation of parents as well as family wealth (socio-economic status) were linked to the performance of students in all participating countries. In Finland, students in the top socio-economic quarter achieved a mean score of 529 points and those in the bottom quarter a mean score of 446 points in mathematics, making the difference 83 points in the mean scores (OECD 93 points). In 2012, which was the previous round when mathematical literacy was the main domain of the assessment, the respective mean scores were 555 points and 488 points, a difference of 67 points. This shows that the mean difference between the top and the bottom socio-economic quarter has increased by 16 points in mathematical literacy. Increasing differences were also observed in reading literacy (5 points) and scientific literacy (11 points) relative to the previous time when these two were the main domains of assessment. This increase is explained by the fact that the outcomes of students of the lowest socio-economic status have weakened somewhat more than those of the highest socio-economic status.

## Greater variation between and within schools

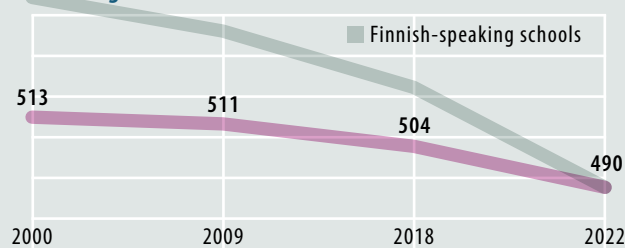
Relative to Finnish-speaking schools, Swedish-speaking schools seemed to show better outcomes overall. Over the past decade, the decline in student performance in Swedish-speaking schools has been slower than in Finnish-speaking schools in all areas of assessment. In addition, for the first time in mathematical literacy, the difference between Finnish-speaking (483 points) and Swedish-speaking (499 points) schools was statistically significantly in favour of Swedish speakers. And in scientific literacy not only was the average score for Swedish-speaking schools (526 points) higher than that for Finnish-speaking schools (510 points), but Swedish speakers had increased their point score relative to their previous assessment score (512 points). In reading literacy, the language of instruction did not make a difference, the mean score being 490 points for the speakers of either language.

In mathematical literacy, the share of weak performers did not increase in Swedish-speaking schools as much as in Finnish-speaking schools. In Swedish-speaking schools, 15 per cent of girls and 21 per cent of boys performed poorly in mathematics, while the respective figures for Finnish-speaking schools were 22 per cent and 27 per cent. In reading literacy and scientific literacy, the percentage of poor performing Swedish-speaking students was similar to that for Finnish-speaking schools.

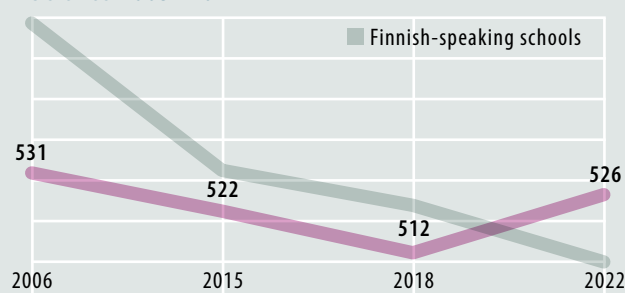
### Mean scores for Swedish-speaking schools: Mathematics 2003–2022



### Reading 2000–2022



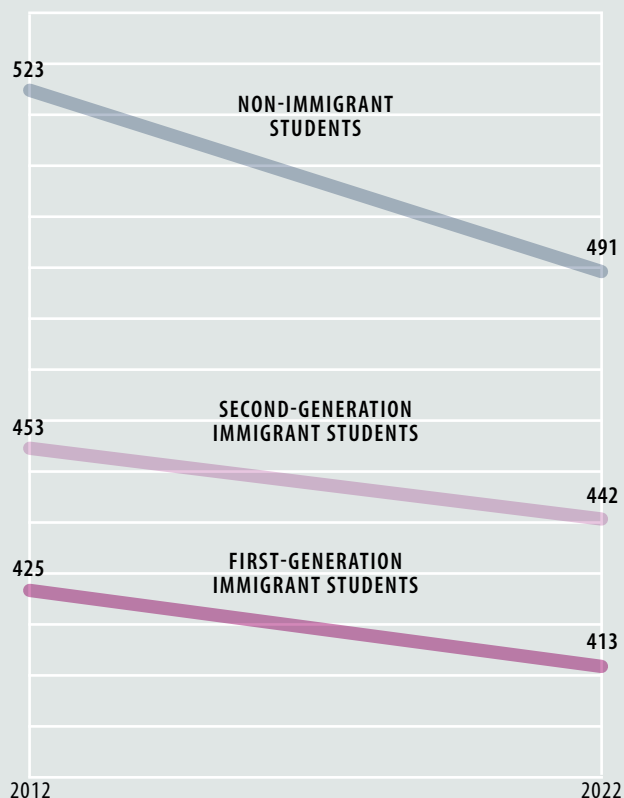
### Science 2003–2022



## Narrower performance gap between immigrant and non-immigrant students in mathematics and science

In mathematical literacy, the mean score was 413 points for first-generation immigrant students and 442 points for second-generation students. For non-immigrant students the mean score was 491 points, making the mean difference in mathematical literacy 78 points between first-generation immigrant students and their non-immigrant peers and 49 points between second-generation immigrant students and their non-immigrant peers in favour of the latter. The disparities between students with migrant backgrounds and those without a migrant background are similar to the disparities observed in Sweden. In mathematical literacy, the mean difference between non-immigrant students and first-generation immigrant students narrowed by 11 points relative to the 2012 round of PISA. In reading literacy, the mean score of non-immigrant students (500 points) was statistically significantly higher than that of their first-generation (384 points) and second-generation (439 points) immigrant peers. Similarly, in scientific literacy the mean score of non-immigrant students (519 points) was statistically significantly higher than the mean scores of first-generation (410 points) and second-generation (453 points) immigrant students. The mean scores of both non-immigrant students and the first-generation and second-generation immigrant students fell in all areas of assessment relative to 2012.

### Mean scores of students with immigrant background and without immigrant background in mathematics Finland 2012 and 2022

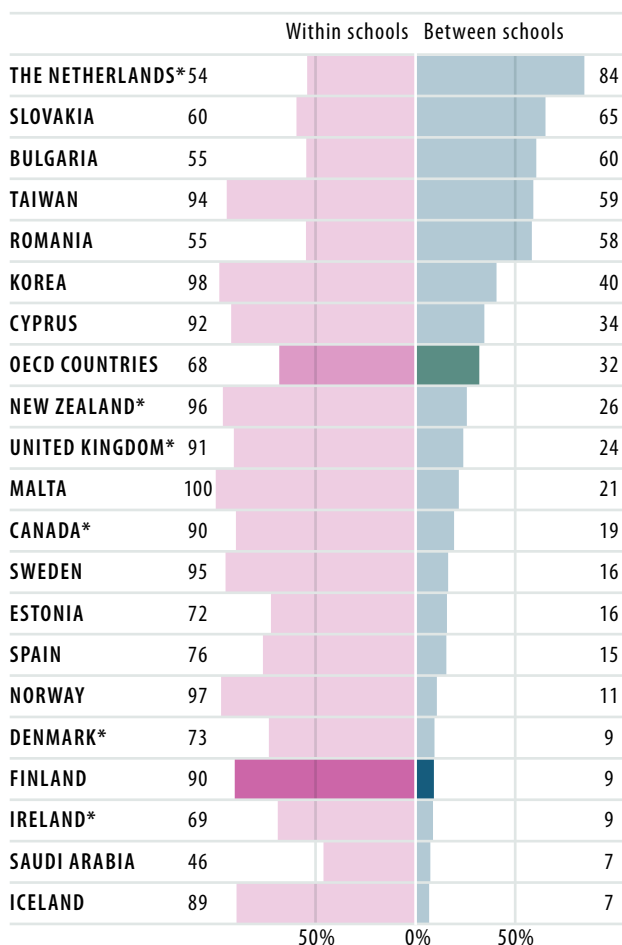


## Greater variation between schools and students

In Finland, disparities between schools have traditionally been small by international standards. In the 2022 assessment, the variation between Finnish schools was 9 percentage points relative to the total variation in mathematical literacy scores throughout OECD countries. In the other Nordic countries, variation between schools was also clearly below the OECD average (32%). School disparities in Denmark\* and Norway were in the same range as in Finland and somewhat higher in Sweden (16%) and Estonia (16%) than in Finland. However, disparities between Finnish schools are now greater than in the earlier PISA rounds. This may be largely explained by mounting disparities between schools outside the Greater Helsinki area, which grew wider from 2012 to 2022. School disparities in Greater Helsinki remained unchanged over the same period whereas disparities between schools outside Greater Helsinki are now close to the level of variation between schools in Greater Helsinki.

Variation between students (within one school) largely remained stable in Finnish lower secondary schools between 2003 and 2018. The disparities, however, then began to increase sharply and by 2022 they had grown wider than in any earlier PISA assessment. Variation within Finnish schools was by then 90 per cent relative to overall variation observed in OECD countries, significantly above the OECD average (68%).

### Variation between schools and within schools of overall variation in scores for mathematics



## Minimal mathematics anxiety – changes in perceived support from teachers and in disciplinary climate

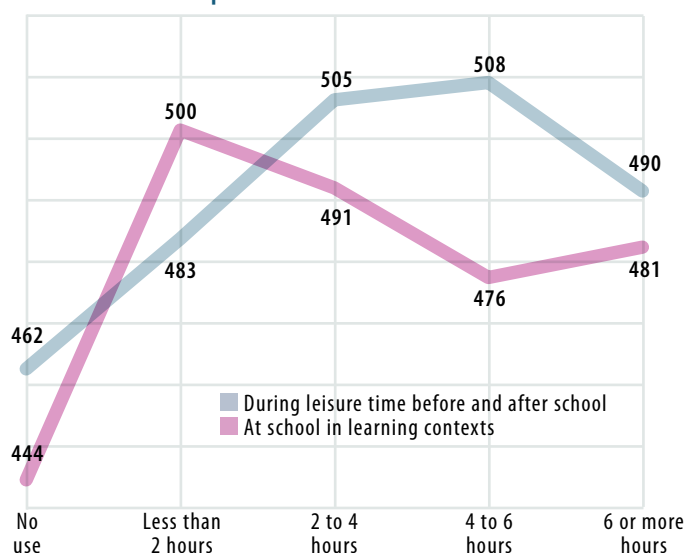
There was both improvement and deterioration in student attitudes towards learning and attending school. Finnish students exhibited the lowest levels of mathematics anxiety in OECD countries. Mathematics anxiety was observed to be linked to the perception of receiving support from the teacher. In other words, the more students felt they received support from their teacher in maths lessons, the less likely they were to feel anxious about maths.

Anxiety in general impacted performance negatively. However, as a rule, the link between anxiety and the weakest proficiency level was not as clear in the well-performing countries of East Asia as it was in the other participating countries. Altogether 78 per cent of Finnish students said teachers gave extra help when they needed it (OECD average 70%) and 59 per cent reported that in most lessons teachers showed an interest in every student's learning (OECD average 63%).

However, there has been a statistically significant 6 to 9 percentage point drop since 2012 in the percentages of students who chose the "every lesson" or "most lessons" options in the most recent assessment. This means that the respondents in 2022 felt they received less help from their teachers than did the respondents in 2012. The questions measuring disciplinary climate indicated that Finnish students experienced poorer classroom discipline than did students on average across OECD countries. Based on the survey questions on disciplinary climate repeated between 2022 and 2012, students perceived classroom discipline to have somewhat improved.

This round included for the first time questions on the degree to which students felt digital devices were disrupting lessons. Of Finnish students, 41 per cent reported that in mathematics lessons the use of digital resources distracted them in every lesson or in most lessons. This figure was markedly higher than the OECD average (31%). But even though the use of digital devices is perceived to disrupt learning, moderate use of digital devices in and out of school is linked to better learning outcomes.

### Use of digital resources at school and during leisure time and performance in mathematics



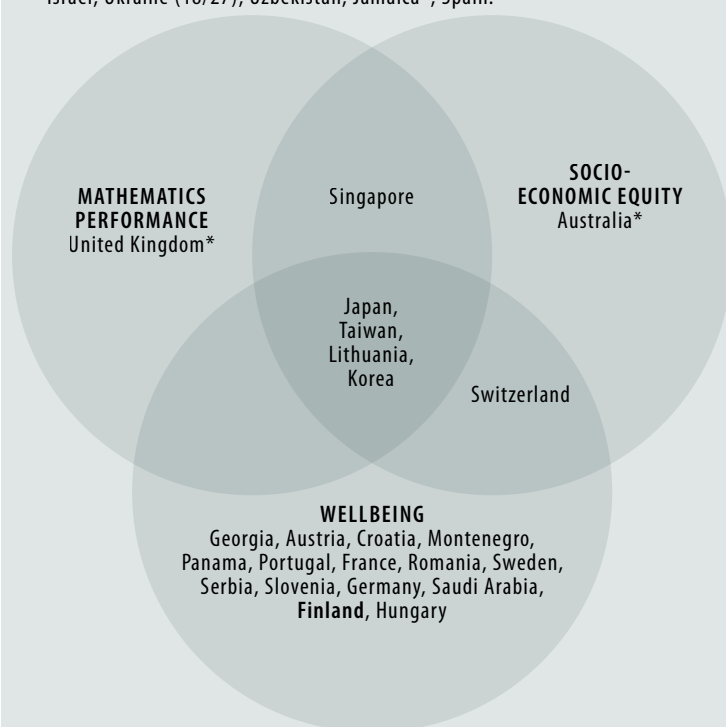
## Resilient education systems

Students who took part in PISA 2022 were affected by the COVID-19 pandemic throughout their lower secondary education, at least indirectly if not otherwise. Earlier studies have shown that the pandemic had negative effects on learning outcomes and that the outcomes varied depending on the age and socio-economic status of the students. Performance fell during the pandemic especially among children whose parents had the lowest level of education. The disparity between the highest and the lowest student performance seems to have become more marked, and the situation of the most disadvantaged students continues to raise concern both in Finland and elsewhere.

The PISA survey also examined school resilience, scrutinising how the participating countries managed to maintain or improve their students' average performance scores, the performance of students of the lowest socio-economic status and the students' sense of belonging. By these criteria, only Japan, Taiwan, Lithuania and Korea had education systems that were assessed to be comprehensively resilient. Six education systems showed resilience in mathematics performance (the four countries above plus Singapore and the United Kingdom\*). The common denominators between these countries were relatively short school closures, the least perceived problems in distance teaching arrangements, and home and school support for learning that was assessed to be better than in other countries. Of the three factors of resilience, Finland succeeded best at maintaining the students' sense of belonging and satisfaction with life.

### Resilient education systems

Note: 15 participating countries lacked the data required for assessing resilience: Kosovo, Palestine, El Salvador, Costa Rica, North Macedonia, Cambodia, Guatemala, Paraguay, Mongolia, Israel, Ukraine (18/27), Uzbekistan, Jamaica\*, Spain.



## Sense of belonging, socio-economic equity and mathematics performance



Compared with OECD average, socio-economic equity is ● above average ● average or below average

Due to the COVID-19 pandemic, education systems struggled to maintain or promote equity, sense of belonging at school and mathematics performance all at the same time. Examining these three factors shows that only four participating countries – Japan, Korea, Finland and Denmark\* – ranked above the OECD average for all three factors.

Examining the associations between declining performance, learning attitudes and experiences during the COVID-19 pandemic does not provide easy answers or explanations. Finnish students reported on the whole feeling confident about their

abilities, their level of maths anxiety was very low by international comparison, and on average students even reported experiencing school attendance in a positive light during the pandemic. Finnish students said they felt less lonely than students on average across OECD countries. They did not feel left behind in learning, and in other ways too their attitudes towards independent learning were more positive and confident than the OECD average. However, while student attitudes largely seem to have improved, this positive development does not appear to be reflected in performance.

