COUNTRY NOTE

OECD

PROGRAMME FOR INTERNATIONAL STUDENT ASSESSMENT (PISA) RESULTS FROM PISA 2015

Japan

Key findings

- Japanese students continue to be strong performers in PISA. With an average score of 538 points in science in PISA 2015, students in Japan are outperformed only by students in Singapore (556 points), and they perform similarly to students in Estonia and Chinese Taipei. Japanese students' average reading score (516 points) is comparable with that of students in Estonia, Germany, Ireland, Korea, New Zealand and Norway; but students in Canada, Finland, Hong Kong (China) and Singapore outperform Japanese students in reading by 10 score points or more. Japanese students attain the same mathematics score (532 points, on average) as students in Beijing-Shanghai-Jiangsu-Guangdong (China) and Korea, but they are outperformed by students in Hong Kong (China), Macao (China), Singapore and Chinese Taipei.

- Across current OECD countries (including Chile, Estonia, Israel, Latvia and Slovenia), the average science score in 2015 (493 points) is not significantly different from the score in 2006 (498 points), when science was the main domain assessed. During the same period, Japan's mean science score remained unchanged (531 points in 2006 and 538 points in 2015)

- The Japanese school system ensures equity in education opportunities (i.e. the relationship between students' socio-economic status and performance is weaker than the OECD average) and its level of equity has remained stable since 2006.

- Compared with 2006, fewer Japanese students in 2015 reported that they enjoy learning science, but more students reported that learning science is useful for their future plans. Students in Japan reported almost the same level of instrumental motivation to learn science as the OECD average. And while Japanese students in 2015 reported a greater sense of self-efficacy in science than their counterparts in 2006, they are still below the OECD average in this respect.

- Gender gaps in science performance and in students' attitudes towards science are significant in Japan. Boys outperform girls in science by an average of 14 points; they also have stronger epistemic beliefs and report greater self-efficacy than girls. Japan also shows one of the largest gender gaps favouring boys in both their enjoyment of learning science (**intrinsic motivation**) and their belief that science is useful for their future careers (**instrumental motivation**).

- Student truancy is less of a problem in Japan than in other PISA-participating countries/economies. On average across OECD countries, 20% of students reported that they had skipped one day of school or more in the two weeks prior to the PISA test; in Japan, 2% of students so reported.

- While similar shares of boys (19%) and girls (18%) in Japan expect to pursue a career in science (the OECD averages are 25% and 24%, respectively), girls envisage themselves as health professionals more than boys do; and boys see themselves as becoming ICT professionals, scientists or engineers more than girls do, similar to the OECD average.

Student performance in science

- Students in Japan score 538 points in science, on average (Table I.2.3) – above the OECD average and comparable with the mean score in Estonia and Chinese Taipei. Only Singapore (556 points) outperforms Japan (Figures I.2.13 and I.2.14).

- Japan's mean performance has remained unchanged since 2006 (531 points in 2006 and 538 points in 2015), with an average non-significant change of 2.7 score points every three years (Table I.2.4a).

- On average across OECD countries, just over 20% of students do not reach the baseline level of proficiency in science (Level 2). In Japan, only 10% of students are low-performers in science, and this share shrank by 2 percentage points between 2006 and 2015, not a significant change. At this level, students can draw on their knowledge of basic science content and procedures to identify an appropriate explanation, interpret data, and identify the question being addressed in a simple experiment (Table I.2.2a).

- Almost 8% of students across OECD countries, and 15% of students in Japan, are top performers in science, meaning that they are proficient at Level 5 or 6. At these levels, students can creatively and autonomously apply their scientific knowledge and skills to a wide variety of situations, including unfamiliar ones. The share of top-performing students in Japan has remained the same since 2006 (Table I.2.2a).

Gender differences in science performance

- In Japan, boys outperform girls in science by an average of 14 points, above the OECD average difference of 4 points. This gender gap increased by 10 points since 2006, but it is not a significant change (Tables I.2.8a and I.2.8d).

- Even though gender differences in science performance tend to be small, on average, in 31 countries and economies, the share of top performers in science is larger among boys than among girls by 2 percentage points. In Japan, the share of top performers among boys (18%) is larger than that among girls (13%) (Tables I.2.6a, I.2.6b and I.2.6d).

- Gender differences in science performance, in favour of boys, are more pronounced when students respond to questions that require content knowledge than when the questions are about procedural or epistemic knowledge. In Japan, students score similarly on the content knowledge and the procedural and epistemic subscales (539 points on the former subscale and 538 points on the latter subscale) (Tables I.2.19b and I.2.20b). On average across OECD countries, boys score 12 points higher than girls on the content knowledge subscale, while girls score 3 points higher than boys on the procedural and epistemic knowledge subscale. In Japan, they score 23 points higher than girls on the content knowledge subscale, and boys score 6 points higher than girls, but not significantly higher, on the procedural and epistemic knowledge subscale (Tables I.2.19d and I.2.20d). Both Japanese boys and girls understand how scientists enquire and build scientific theories, while boys perform better than girls when they are asked about knowledge of the natural world and of technological artefacts.

Student performance in reading

- Students in Japan score 516 points in reading, on average – above the OECD average and comparable with the mean score in Estonia, Germany, Ireland, Korea, New Zealand and Norway. Canada, Finland, Hong Kong (China) and Singapore outperform Japan in reading (Table I.4.3 and Figure I.4.1).

- Japan's mean performance has remained unchanged since 2009 (520 points) and 2000 (522 points) when reading was the major domain assessed. However, when Japan's 2015 mean score in reading (516 points) is compared with that when reading was a minor domain, the scores fluctuated. Students in Japan scored 498 points in reading in both 2003 and 2006, while they scored 538 points in 2012 (Table I.4.4a).

- About 20% of students in OECD countries, on average, do not attain the baseline level of proficiency in reading (Level 2), considered the level at which students begin to demonstrate the reading skills that will enable them to participate effectively and productively in life. In Japan, 13% of students perform below Level 2 in reading, similar to the share of low performers in 2009 (Table I.4.2a).

- Across OECD countries, 8% of students are top performers in reading, meaning that they are proficient at Level 5 or 6. In Japan, 11% of students attain this level of proficiency. At these levels students can find information in texts that are unfamiliar in form or content, demonstrate detailed understanding, and infer which information is relevant to the task. They are also able to critically evaluate such texts and build hypotheses about them, drawing on specialised knowledge and accommodating concepts that may be contrary to expectations. Japan's share of top performers in reading has remained stable since 2009 when reading was the main domain assessed (Table I.4.2a).

Gender differences in reading performance

- Girls outperform boys in reading by an average of 13 points, below the OECD average of 27 points. This gender gap shrank by 26 points since 2009, a greater reduction than the OECD average of 12 points (Tables I.4.8a and I.4.8d).

- In 2009, the share of top performers in reading in Japan was larger among girls (17%) than among boys (10%) and the share of low performers was larger among boys (19%) than among girls (8%). However, in 2015, the shares of top performers among girls (11%) and among boys (10%) are similar, while the share of low performers is still larger among boys (15%) than among girls (11%) (Tables I.4.6a, I.4.6b and I.4.6d).

Student performance in mathematics

- Students in Japan score 532 points in mathematics, on average (Table I.5.3) – above the OECD average and comparable with the mean score in Beijing-Shanghai-Jiangsu-Guangdong (China) and Korea. Students in Hong Kong (China), Macao (China), Singapore and Chinese Taipei score higher in mathematics than Japanese students (see Figure I.5.1).

- Japan's mean mathematics score has remained unchanged since 2003 (534 points), when mathematics was the main domain assessed (Table I.5.4a).

- On average across OECD countries, almost one in four students does not reach the baseline level of proficiency in mathematics (Level 2); in Japan, only about one in ten students (11%) is a low performer in mathematics. The share of low performers in Japan has remained unchanged since 2003 (Table I.5.2a).

- Around one in ten students is a top performer in mathematics, on average across OECD countries; but in Singapore, more than one in three students are top performers in the subject. In Japan, one in five students is a top performer, as was the case in 2003 (Table I.5.2a).

Gender differences in mathematics performance

- Boys in Japan outperform girls in mathematics by an average of 14 points, above the OECD average (8 points) (Table I.5.8).

Students' engagement with science

Disposition towards the scientific method of enquiry

PISA 2015 asked students about their beliefs about the nature of science knowledge and the validity of scientific methods of enquiry (collectively known as epistemic beliefs). Students whose epistemic beliefs are in agreement with current views about the nature of science can be said to value scientific approaches to enquiry.

- In Japan, 81 % of students (compared with 84% of students across OECD countries) reported that they agree or strongly agree that a good way to know if something is true is to do an experiment; 82% reported that ideas in science sometimes change (the OECD average is 81%); and 85% reported that good answers are based on evidence from many different experiments (the OECD average is 86%) (Table I.2.12a).

- In 35 countries and economies, girls reported to have stronger agreement about the tentative, evolving and cumulative nature of scientific knowledge and those related to the stronger support for empirical approaches to scientific enquiry, than girls in 35 countries and economies, in Japan the opposite is observed. Only in Japan, Costa Rica, Germany and Singapore, boys reported to have stronger epistemic beliefs than girls (Table I.2.12c).

Students' expectations of a career in science

PISA 2015 asked students what occupation they expect to be working in when they are 30 years old.

- Even though many 15-year-olds are undecided about their future, almost one in four students across OECD countries reported that they expect to work in an occupation that requires further science training beyond compulsory education, compared with 18% in Japan (Table I.3.10b). In 55 countries and economies, more than 20% of students hold such expectations, and in 33 countries and economies, more than 25% of students do.

- In Japan, the share of students who expect to be working in a science-related occupation when they are 30 increased by 5 percentage points between 2006 and 2015, largely because of an increase in the share of students who expect to be working as information and communication technology professionals (an increase of 2.4 percentage points) or as science-related technicians and associate professionals (an increase of 0.9 percentage points) (Table I.3.10a).

- In almost all countries/economies, the expectation of pursuing a career in science is strongly related to proficiency in science. On average across OECD countries, only 13% of low performers who score below PISA proficiency Level 2 in science hold such expectations; but that percentage more than triples to 42% among top performers in science (those who score at or above Level 5). In Japan, 8% of low performers and 26% of top performers are expecting to pursue a career in science (Table I.3.10b).

- In Japan, similar shares of boys (19%) and girls (18%) expect to pursue a career in science (the OECD averages are 25% and 24%, respectively). Even when similar shares of boys and girls expect a science-related career, boys and girls tend to think of working in different fields of science. In all countries, girls envisage themselves as health professionals more than boys do; and in almost all countries, boys see themselves as becoming ICT professionals, scientists or engineers more than girls do. In Japan, 2% of girls but 8% of boys expect to work as engineers, scientists or architects, and only 0.4% of girls but 4% of boys expect to work as ICT professionals. Some 5% of boys, but 15% of girls, expect to work as doctors, veterinarians or nurses (health professionals) (Tables I.3.10b, I.3.11a, I.3.11b, I.3.11c).

Students' science self-beliefs

When a student is confident in his or her ability to accomplish particular goals in the context of science, he or she is said to have a greater sense of **self-efficacy** in science. Better performance in science leads to a greater sense of self-efficacy, through positive feedback received from teachers, peers and parents, and the positive emotions associated with that feedback.

- In Japan, students in 2015 reported greater sense of self-efficacy than those in 2006, even though it is still below the OECD average (Tables I.3.4f).

- In 41 countries and economies, including Japan, boys reported significantly greater self-efficacy than girls. In Japan, gender differences in science self-efficacy are larger than the OECD average (Figure I.3.20 and Table I.3.4c).

Students' motivation for science learning

PISA distinguishes between two forms of motivation to learn science: students may learn science because they enjoy it (**intrinsic motivation**) and/or because they perceive learning science to be useful for their future plans (**instrumental motivation**).

- In Japan, compared with 2006, students in 2015 reported fewer students reported that they enjoy learning science and the level of enjoyment of science is much below the OECD average. In contrast, more students in 2015, compared with those in 2006, reported that learning science is useful for their future plans and the level of instrumental motivation is almost the same level as the OECD average (Tables I.3.1.f and I.3.4f).

- A majority of students who participated in PISA 2015 reported that they enjoy and are interested in learning science, but boys tended to report so more than girls. In Japan, the gender gap in intrinsic motivation is larger than that in every other country and economy that participated in PISA 2015. Some 63% of boys in Japan, compared with 46% of girls, agreed or strongly agreed with the statement "I enjoy acquiring new knowledge in science" (the OECD averages are 69% and 64%, respectively) (Table 1.3.1c).

- The gender gap in Japanese students' instrumental motivation to learn science is also one of the largest observed among all participating countries and economies. Some 57% of boys in Japan agreed that what they learn in their school science subject(s) will help them to get a job, while 47% of girls agreed with that statement (the OECD averages are 63% and 59%, respectively (Table 1.3.3c).

Student truancy

- On average across OECD countries, 20% of students reported that they had skipped one day of school or more in the two weeks prior to the PISA test; in Japan, 2% of students so reported. Some 12% of students in Japan reported that they had arrived late for school during the same period, while 44% of students across OECD countries so reported. Japan shows some of the lowest incidences of student truancy among all countries and economies that participated in PISA 2015 (Table II.3.1).

- Students who arrive late or play truant miss learning opportunities. They also disrupt class, creating a disciplinary climate that is not conducive to learning for their fellow students. In PISA-participating countries and economies, skipping a whole day of school is more common in disadvantaged schools than in advantages schools. (Disadvantaged schools are defined as schools in the bottom quarter on the PISA index of economic, social and cultural status of schools within each country/economy). This is observed in 44 countries and economies, including Japan, compared with only 4 education systems where students in advantaged schools are more likely to have skipped a day of school (Table II.3.4).

- On average across OECD countries, students who had skipped a whole day of school at least once in the two weeks prior to the PISA assessment score 45 points lower in the science assessment than students who had not skipped a day of school (and 33 points lower after accounting for the socio-economic profile of students and schools – the equivalent of almost one full year of schooling). In Japan, students who reported that they had skipped days of school score 48 points lower in science than students who reported that they had not skipped school (Table II.3.4).

- Students across OECD countries score lower on the PISA science test when more of their peers had skipped a whole day of school at least once in the two weeks prior to the PISA test, even after taking into account whether the student himself/herself had skipped school, and the socio-economic status of students and schools. In Japan, students score two points lower in science for every percentage-point increase in the proportion of peers who had skipped a day of school (the OECD average difference in scores is one point) (Table II.3.8).

- Between 2012 and 2015, the percentage of students in Japan who had skipped a day of school in the two weeks prior to the PISA test remained stable, while it has increased across OECD countries by five percentage points, signalling a deterioration in students' engagement with school (Tables II.3.1, II.3.2 and II.3.3).

Context for student achievement

Japan's per capita GDP, after accounting for purchasing power parity in 2014, was USD 36 619, similar to the per capita GDP of Italy and New Zealand, but below the OECD average per capita GDP (USD 39 333). Japan spends an average of USD 93 200 per student from the age of 6 to 15, which is above the OECD average of USD 90 294.

Only 0.2% of 15-year-old students in Japan have an immigrant background, compared with 5% of students across OECD countries. In Japan, 29% of 35-44 year-olds hold a tertiary degree (the OECD average is 37%).

In addition, there is less variation in students' socio-economic status in Japan than in many other countries/economies that participated in PISA 2015. The PISA index of economic, social, and cultural status is based on information about the occupation and educational attainment of students' parents and about students' home possessions. In Japan, 8% of students are in the bottom two deciles of the index (the OECD average is 12%), while 11% of students are in the top two deciles (the OECD average is 27%) (Tables I.2.11, I.6.2a and I.6.4a).

The impact of socio-economic status on performance

- Japan, along with Canada, Estonia and Finland, achieves high levels of performance and equity in education outcomes as assessed in PISA 2015, with 10% or less of the variation in student performance attributed to differences in students' socio-economic status. Across OECD countries, 13% of the variation is so explained (Figure I.6.6 and Table I.6.3a).

- Across OECD countries, 38 score-point difference in science is associated with a one-unit increase in the PISA index of economic, social, and cultural status – the equivalent of more than one year of schooling. In Japan, the difference is 42 points (Figure I.6.2).

Some 29% of disadvantaged students (those in the bottom quarter of the PISA index of economic, social and cultural status in each country) across OECD countries are "**resilient**", meaning that they beat the socio-economic odds against them and perform among the top 25% of students around the world. In Japan, the percentage of resilient students has grown by 8 percentage points since 2006, so that nearly one in two disadvantaged students (49%) is considered resilient (Table I.6.7). In Hong Kong (China), Macao (China) and Viet Nam, more than 60% of disadvantaged students are resilient.

Education policies and practices

Opportunity to learn science at school

Inequalities in opportunities to learn are mainly reflected in the time education systems, schools and teachers allocate to learning. If time is a necessary condition for learning, students who do not attend science lessons are probably those who enjoy the fewest opportunities to acquire competencies in science. When interpreting the relationship between school characteristics and student performance, bear in mind that in Japan, 15-year-old students had been enrolled in their current school for only for a few months when they sat the PISA test.

- On average across OECD countries, 94% of students reported that they attend at least one science course per week. But that means that at least one million 15-year-old students are not required to attend any science lesson (Table II.2.3). In Japan, 2.6% of students reported that they are not required to attend a science lesson – less than half the OECD average.

- Students who are not required to attend science lessons score 25 points lower in science than students who are required to attend at least one science lesson per week, on average across OECD countries and after accounting for the socio-economic profile of students and schools. In Japan, students who are not required to attend science classes score 58 points lower in science before accounting for the socio-economic profile of students and schools; but the score-point difference becomes smaller and not significant after accounting for the socio-economic profile of students and schools (Table II.2.3).

Extracurricular science activities

Science-related extracurricular activities, such as science clubs and competitions, help students understand scientific concepts, raise interest in science and even nurture future scientists.

- In Japan, 60% of students are enrolled in schools that offer a science club (the OECD average is 39%) and 24% attend schools that offer science competitions (the OECD average is 66%). Science clubs are most commonly offered in East Asian countries and economies. For example, in Beijing-Shanghai-Jiangsu-Guangdong (China), Hong Kong (China) and Korea, more than 90% of students attend schools that offer science clubs. By contrast, science competitions are most frequently offered in several Eastern European countries, including Estonia, Hungary, Lithuania, Moldova, Poland and the Russian Federation, where more than 90% of students attend schools that offer these activities (Table II.2.11).

- In Japan, advantaged schools offer science clubs and competitions more often than disadvantaged schools do. For example, while 50% of students enrolled in disadvantaged schools are offered science clubs, 83% of students in advantaged schools are offered this activity. This 33 percentage-point difference is larger than the OECD average difference of 17 percentage points. Moreover, in Japan, students in schools that offer science clubs score 37 points higher in science (8 points higher, a not statistically significant difference, after accounting for students' and schools' socio-economic profile). They also hold stronger epistemic beliefs, such as understanding that scientific ideas sometimes change or that evidence comes from experiments, although this difference is not statistically significant after accounting for students' and schools' socio-economic profile (Tables II.2.12 and II.2.13).

Teaching strategies

How teachers teach science is more strongly associated with science performance and students' expectations of working in a science-related career than the material and human resources of science departments, including the qualifications of teachers or the kinds of extracurricular science activities offered to students.

- Almost everywhere, students who reported that their teachers explain scientific ideas more frequently score higher in science, even after accounting for socio-economic status. In Japan, 48% of students reported that their teachers explain scientific ideas in many or all lessons (the OECD average is 55%), and these students score 21 points higher in science than students who reported that their teachers explain scientific ideas only in some lessons or never (16 points higher after accounting for students' and schools' socio-economic profile) (Tables II.2.16 and II.2.18).

In almost all school systems, students who reported that their teachers adapt the lesson to students' needs and knowledge more frequently score higher in science, even after accounting for socio-economic status.

- In Japan, 55% of students reported that their teachers adapt most or every lesson to the class's needs and knowledge (the OECD average is 45%), and these students score 13 points higher in science than students who reported that their teachers never or only sometimes adapt lessons to the class's needs and knowledge (they score 7 points higher after accounting for students' and schools' socio-economic profile) (Tables II.2.22 and II.2.24).

Learning time

- Students in Japan devote less time to learning in relation to their high PISA scores in science, compared with students in other countries. The ratio between PISA scores and learning time in and outside of school (how many score points for each hour spent learning) is 13.1 points per hour in Japan (the OECD average is 11.2 points per hour). One hour of learning corresponds to more or a similar level of science score points as Japan, in Finland (14.7 points), Germany (13.9 points) and Switzerland (13.2 points) In contrast, the ratio is lower in some high performing systems such as Korea (10.2 points per hour) and Singapore (10.9 points per hour). (Figure II.6.23).

- Japanese 15-year-old students spend 27.5 hours per week in regular lessons at school, on average, and 13.6 hours per week studying after school. On average across OECD countries, students spend 26.9 hours per week in regular lessons at school and 17.1 hours per week studying after school (Tables II.6.32 and II.6.37).

Resource allocation

- Equitable resource allocation means that the schools attended by socio-economically disadvantaged students are at least as well-equipped as the schools attended by advantaged students, to compensate for inequalities in the home environment. Based on school principals' reports, in 26 countries and economies, not including Japan, advantaged schools are better equipped than disadvantaged schools (Table II.6.3).

- With the exception of Ciudad Autónoma de Buenos Aires (Argentina) and Macao (China), all school systems where principals of disadvantaged schools are considerably more concerned about the material resources at their school than principals of advantaged schools score below 450 points in science. In Japan, principals of disadvantaged schools are as concerned about the material resources in their schools as principals of advantaged schools (Table II.6.2)

Selecting and sorting students

- On average across OECD countries, school systems begin selecting students for different programmes at the age of 14. Some OECD countries, including Austria and Germany, start selecting students as early as age 10. In Japan, schools start selecting students at age 15, later than the OECD average. The later students are selected into different academic programmes/schools and the lower the percentage of students who had repeated a grade, the greater the equity in science performance, even after accounting for country/economy's mean score in science and the variation in student performance (Figure 5.13).

- In countries and economies with large enrolments in pre-vocational or vocational programmes, these enrolments vary markedly according to the schools' socio-economic profile. On average across OECD countries, the proportion of 15-year-old students enrolled in a vocational track is 21 percentage points smaller among students in advantaged schools than among students in disadvantaged schools. The difference in enrolment in pre-vocational or vocational programmes related to schools' socio-economic profile is largest (60 percentage points or more) in Austria, Croatia, Italy, the Netherlands and Slovenia. In Japan, the difference is 50 percentage points, larger than the OECD average (Table II.5.17).

School governance

- In education systems where principals hold greater responsibility for school governance, students score higher in science; and this relationship is stronger in school systems where the percentage of students whose achievement data are tracked over time and posted publicly is higher than the OECD average (Figure II.4.10).

- In Japan, 28% of the responsibility for resources lies with principals (the OECD average is 39%) as does 62% of the responsibility for the curriculum (the OECD average is 22%) (Table II.4.2). In Japan, 4% of students attend schools where achievement data are posted publicly (the OECD average is 44%); 8% of students attend schools where achievement data are tracked over time by an administrative authority (the OECD average is 71%); and 88% of students attend schools where achievement data are provided directly to parents (the OECD average is 84%) (Table II.4.17).

- Between 2009 and 2015, school principals in Japan assumed greater responsibility for selecting teachers (an increase of 8 percentage points), firing teachers (an increase of 9 percentage points), and formulating the school budget (an increase of 18 percentage points) (Table II.4.4).

Snapshot of performance in science, reading and mathematics

Countries/economies with a mean performance/share of top performers **above** the OECD average
Countries/economies with a share of low achievers **below** the OECD average

Countries/economies with a mean performance/share of top performers/
share of low achievers not significantly different from the OECD average

Countries/economies with a mean performance/share of top performers **below** the OECD average
Countries/economies with a share of low achievers **above** the OECD average

	Science		Reading		Mathematics		Science, reading and mathematics	
	Mean score in PISA 2015	Average three-year trend	Mean score in PISA 2015	Average three-year trend	Mean score in PISA 2015	Average three-year trend	Share of top performers in at least one subject (Level 5 or 6)	Share of low achievers in all three subjects (below Level 2)
	Mean	Score dif.	Mean	Score dif.	Mean	Score dif.	%	%
OECD average	493	-1	493	-1	490	-1	15.3	13.0
Singapore	556	**7**	535	**5**	564	1	39.1	4.8
Japan	538	3	516	-2	532	1	25.8	5.6
Estonia	534	2	519	**9**	520	2	20.4	4.7
Chinese Taipei	532	0	497	1	542	0	29.9	8.3
Finland	531	**-11**	526	**-5**	511	**-10**	21.4	6.3
Macao (China)	529	**6**	509	**11**	544	**5**	23.9	3.5
Canada	528	-2	527	1	516	**-4**	22.7	5.9
Viet Nam	525	-4	487	**-21**	495	**-17**	12.0	4.5
Hong Kong (China)	523	**-5**	527	-3	548	1	29.3	4.5
B-S-J-G (China)	518	m	494	m	531	m	27.7	10.9
Korea	516	-2	517	**-11**	524	-3	25.6	7.7
New Zealand	513	**-7**	509	**-6**	495	**-8**	20.5	10.6
Slovenia	513	-2	505	**11**	510	2	18.1	8.2
Australia	510	**-6**	503	**-6**	494	**-8**	18.4	11.1
United Kingdom	509	-1	498	2	492	-1	16.9	10.1
Germany	509	-2	509	**6**	506	2	19.2	9.8
Netherlands	509	**-5**	503	-3	512	**-6**	20.0	10.9
Switzerland	506	-2	492	-4	521	-1	22.2	10.1
Ireland	503	0	521	**13**	504	0	15.5	6.8
Belgium	502	-3	499	-4	507	**-5**	19.7	12.7
Denmark	502	2	500	3	511	-2	14.9	7.5
Poland	501	3	506	3	504	**5**	15.8	8.3
Portugal	501	**8**	498	4	492	**7**	15.6	10.7
Norway	498	3	513	**5**	502	1	17.6	8.9
United States	496	2	497	-1	470	-2	13.3	13.6
Austria	495	**-5**	485	-5	497	-2	16.2	13.5
France	495	0	499	2	493	**-4**	18.4	14.8
Sweden	493	**-4**	500	1	494	**-5**	16.7	11.4
Czech Republic	493	**-5**	487	5	492	**-6**	14.0	13.7
Spain	493	2	496	**7**	486	1	10.9	10.3
Latvia	490	1	488	2	482	0	8.3	10.5
Russia	487	3	495	**17**	494	**6**	13.0	7.7
Luxembourg	483	0	481	**5**	486	-2	14.1	17.0
Italy	481	2	485	0	490	**7**	13.5	12.2
Hungary	477	**-9**	470	**-12**	477	**-4**	10.3	18.5
Lithuania	475	-3	472	2	478	-2	9.5	15.3
Croatia	475	**-5**	487	**5**	464	0	9.3	14.5
CABA (Argentina)	475	**51**	475	**46**	456	**38**	7.5	14.5
Iceland	473	**-7**	482	**-9**	488	**-7**	13.2	13.2
Israel	467	**5**	479	2	470	**10**	13.9	20.2
Malta	465	2	447	3	479	**9**	15.3	21.9
Slovak Republic	461	**-10**	453	**-12**	475	**-6**	9.7	20.1
Greece	455	**-6**	467	**-8**	454	1	6.8	20.7
Chile	447	2	459	5	423	4	3.3	23.3
Bulgaria	446	4	432	1	441	**9**	6.9	29.6
United Arab Emirates	437	**-12**	434	-8	427	-7	5.8	31.3
Uruguay	435	1	437	**5**	418	-3	3.6	30.8
Romania	435	**6**	434	4	444	**10**	4.3	24.3
Cyprus[1]	433	-5	443	-6	437	-3	5.6	26.1
Moldova	428	**9**	416	**17**	420	**13**	2.8	30.1
Albania	427	**18**	405	**10**	413	**18**	2.0	31.1
Turkey	425	2	428	**-18**	420	2	1.6	31.2
Trinidad and Tobago	425	**7**	427	**5**	417	2	4.2	32.9
Thailand	421	2	409	**-6**	415	1	1.7	35.8
Costa Rica	420	-7	427	**-9**	400	-6	0.9	33.0
Qatar	418	**21**	402	**15**	402	**26**	3.4	42.0
Colombia	416	**8**	425	6	390	**5**	1.2	38.2
Mexico	416	2	423	-1	408	**5**	0.6	33.8
Montenegro	411	1	427	**10**	418	**6**	2.5	33.0
Georgia	411	**23**	401	**16**	404	**15**	2.6	36.3
Jordan	409	**-5**	408	2	380	-1	0.6	35.7
Indonesia	403	3	397	-2	386	**4**	0.8	42.3
Brazil	401	3	407	-2	377	**6**	2.2	44.1
Peru	397	**14**	398	**14**	387	**10**	0.6	46.7
Lebanon	386	m	347	m	396	m	2.5	50.7
Tunisia	386	0	361	**-21**	367	**4**	0.6	57.3
FYROM	384	m	352	m	371	m	1.0	52.2
Kosovo	378	m	347	m	362	m	0.0	60.4
Algeria	376	m	350	m	360	m	0.1	61.1
Dominican Republic	332	m	358	m	328	m	0.1	70.7

1. Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.
Notes: Values that are statistically significant are marked in bold (see Annex A3).
The average trend is reported for the longest available period since PISA 2006 for science, PISA 2009 for reading, and PISA 2003 for mathematics.
Countries and economies are ranked in descending order of the mean science score in PISA 2015.

Source: OECD, PISA 2015 Database, Tables I.2.4a, I.2.6, I.2.7, I.4.4a and I.5.4a.
StatLink http://dx.doi.org/10.1787/888933431961

Snapshot of students' science beliefs, engagement and motivation

Countries/economies with values **above** the OECD average
Countries/economies with values not significantly different from the OECD average
Countries/economies with values **below** the OECD average

	Mean science score	Beliefs about the nature and origin of scientific knowledge		Share of students with science-related career expectations				Motivation for learning science		
		Index of epistemic beliefs (support for scientific methods of enquiry)	Score-point difference per unit on the index of epistemic beliefs	All students	Boys	Girls	Increased likelihood of boys expecting a career in science	Index of enjoyment of learning science	Score-point difference per unit on the index of enjoyment of learning science	Gender gap in enjoyment of learning science (Boys - Girls)
	Mean	Mean index	Score dif.	%	%	%	Relative risk	Mean index	Score dif.	Dif.
OECD average	493	0.00	**33**	24.5	25.0	23.9	**1.1**	0.02	**25**	**0.13**
Singapore	556	0.22	**34**	28.0	31.8	23.9	**1.3**	0.59	**35**	**0.17**
Japan	538	-0.06	**34**	18.0	18.5	17.5	1.1	-0.33	**27**	**0.52**
Estonia	534	0.01	**36**	24.7	28.9	20.3	**1.4**	0.16	**24**	0.05
Chinese Taipei	532	0.31	**38**	20.9	25.6	16.0	**1.6**	-0.06	**28**	**0.39**
Finland	531	-0.07	**38**	17.0	15.4	18.7	**0.8**	-0.07	**30**	0.04
Macao (China)	529	-0.06	**26**	20.8	22.0	19.6	**1.1**	0.20	**21**	**0.16**
Canada	528	0.30	**29**	33.9	31.2	36.5	**0.9**	0.40	**26**	**0.15**
Viet Nam	525	-0.15	**31**	19.6	21.2	18.1	**1.2**	0.65	**14**	**0.06**
Hong Kong (China)	523	0.04	**23**	23.6	22.9	24.2	0.9	0.28	**20**	**0.26**
B-S-J-G (China)	518	-0.08	**37**	16.8	17.1	16.5	1.0	0.37	**28**	**0.14**
Korea	516	0.02	**38**	19.3	21.7	16.7	**1.3**	-0.14	**31**	**0.32**
New Zealand	513	0.22	**40**	24.8	21.7	27.9	**0.8**	0.20	**32**	0.03
Slovenia	513	0.07	**33**	30.8	34.6	26.8	**1.3**	-0.36	**22**	-0.03
Australia	510	0.26	**39**	29.2	30.3	28.2	**1.1**	0.12	**33**	**0.16**
United Kingdom	509	0.22	**37**	29.1	28.7	29.6	1.0	0.15	**30**	**0.18**
Germany	509	-0.16	**34**	15.3	17.4	13.2	**1.3**	-0.18	**29**	**0.43**
Netherlands	509	-0.19	**46**	16.3	16.9	15.7	1.1	-0.52	**30**	**0.25**
Switzerland	506	-0.07	**34**	19.5	19.8	19.1	1.0	-0.02	**30**	**0.17**
Ireland	503	0.21	**36**	27.3	28.0	26.6	1.1	0.20	**32**	**0.09**
Belgium	502	0.00	**34**	24.5	25.3	23.6	1.1	-0.03	**28**	**0.20**
Denmark	502	0.17	**32**	14.8	11.8	17.7	**0.7**	0.12	**26**	**0.09**
Poland	501	-0.08	**27**	21.0	15.4	26.8	**0.6**	0.02	**18**	**-0.10**
Portugal	501	0.28	**33**	27.5	26.7	28.3	0.9	0.32	**23**	**0.08**
Norway	498	-0.01	**35**	28.6	28.9	28.4	1.0	0.12	**29**	**0.27**
United States	496	0.25	**32**	38.0	33.0	43.0	**0.8**	0.23	**26**	**0.21**
Austria	495	-0.14	**36**	22.3	26.6	18.0	**1.5**	-0.32	**25**	**0.23**
France	495	0.01	**30**	21.2	23.6	18.7	**1.3**	-0.03	**30**	**0.31**
Sweden	493	0.14	**38**	20.2	21.8	18.5	**1.2**	0.08	**27**	**0.22**
Czech Republic	493	-0.23	**41**	16.9	18.6	15.0	**1.2**	-0.34	**27**	-0.06
Spain	493	0.11	**30**	28.6	29.5	27.8	1.1	0.03	**28**	**0.11**
Latvia	490	-0.26	**27**	21.3	21.1	21.5	1.0	0.09	**18**	0.03
Russia	487	-0.26	**27**	23.5	23.2	23.8	1.0	0.00	**16**	0.07
Luxembourg	483	-0.15	**35**	21.1	24.3	18.0	**1.4**	0.10	**26**	**0.14**
Italy	481	-0.10	**34**	22.6	24.7	20.6	**1.2**	0.00	**22**	**0.24**
Hungary	477	-0.36	**35**	18.3	23.9	12.8	**1.9**	-0.23	**20**	-0.02
Lithuania	475	0.11	**22**	23.9	22.5	25.4	**0.9**	0.36	**20**	**-0.14**
Croatia	475	0.03	**32**	24.2	26.8	21.8	**1.2**	-0.11	**22**	0.05
CABA (Argentina)	475	0.09	**28**	27.8	26.2	29.3	0.9	-0.20	**15**	**-0.14**
Iceland	473	0.29	**28**	23.8	20.1	27.3	**0.7**	0.15	**24**	**0.26**
Israel	467	0.18	**38**	27.8	26.1	29.5	**0.9**	0.09	**20**	0.06
Malta	465	0.09	**54**	25.4	30.2	20.4	**1.5**	0.18	**48**	**0.11**
Slovak Republic	461	-0.35	**36**	18.8	18.5	19.0	1.0	-0.24	**25**	-0.02
Greece	455	-0.19	**36**	25.3	25.7	24.9	1.0	0.13	**27**	**0.12**
Chile	447	-0.15	**23**	37.9	36.9	39.0	0.9	0.08	**15**	**-0.09**
Bulgaria	446	-0.18	**34**	27.5	28.8	25.9	1.1	0.28	**17**	**-0.16**
United Arab Emirates	437	0.04	**33**	41.3	39.9	42.6	**0.9**	0.47	**22**	-0.02
Uruguay	435	-0.13	**27**	28.1	23.8	31.9	**0.7**	-0.10	**16**	**-0.07**
Romania	435	-0.38	**27**	23.1	23.3	23.0	1.0	-0.03	**17**	-0.05
Cyprus*	433	-0.15	**33**	29.9	29.3	30.5	1.0	0.15	**29**	0.06
Moldova	428	-0.14	**37**	22.0	22.5	21.3	1.1	0.33	**22**	**-0.17**
Albania	427	-0.03	m	24.8	m	m	m	0.72	m	m
Turkey	425	-0.17	**18**	29.7	34.5	24.9	**1.4**	0.15	**12**	0.01
Trinidad and Tobago	425	-0.02	**28**	27.8	24.6	31.0	**0.8**	0.19	**24**	-0.01
Thailand	421	-0.07	**35**	19.7	12.4	25.2	**0.5**	0.42	**18**	-0.05
Costa Rica	420	-0.15	**16**	44.0	43.8	44.2	1.0	0.35	**4**	-0.03
Qatar	418	-0.10	**33**	38.0	36.3	39.9	**0.9**	0.36	**25**	0.00
Colombia	416	-0.19	**21**	39.7	37.1	42.0	**0.9**	0.32	**7**	-0.02
Mexico	416	-0.17	**17**	40.7	45.4	35.8	**1.3**	0.42	**12**	0.01
Montenegro	411	-0.32	**23**	21.2	20.1	22.4	**0.9**	0.09	**14**	**-0.07**
Georgia	411	0.05	**42**	17.0	16.4	17.7	0.9	0.34	**23**	**-0.13**
Jordan	409	-0.13	**28**	43.7	44.6	42.8	1.0	0.53	**23**	**-0.25**
Indonesia	403	-0.30	**16**	15.3	8.6	22.1	**0.4**	0.65	**6**	**-0.06**
Brazil	401	-0.07	**27**	38.8	34.4	42.8	**0.8**	0.23	**19**	**-0.04**
Peru	397	-0.16	**23**	38.7	42.7	34.6	**1.2**	0.40	**9**	0.01
Lebanon	386	-0.24	**35**	39.7	41.0	38.5	1.1	0.38	**32**	-0.04
Tunisia	386	-0.31	**18**	34.4	28.5	39.5	**0.7**	0.52	**15**	**-0.12**
FYROM	384	-0.18	**30**	24.2	20.0	28.8	**0.7**	0.48	**17**	**-0.29**
Kosovo	378	0.03	**22**	26.4	24.7	28.1	**0.9**	0.92	**14**	**-0.16**
Algeria	376	-0.31	**16**	26.0	23.1	29.2	**0.8**	0.46	**14**	**-0.12**
Dominican Republic	332	-0.10	**13**	45.7	44.7	46.8	1.0	0.54	**6**	-0.05

* See note 1 under Figure I.1.1.
Note: Values that are statistically significant are indicated in bold (see Annex A3).
Countries and economies are ranked in descending order of the mean science score in PISA 2015.
Source: OECD, PISA 2015 Database, Tables I.2.12a-b, I.3.1a-c and I.3.10a-b.
StatLink http://dx.doi.org/10.1787/888933431979

What is PISA?

The Programme for International Student Assessment (PISA) is an ongoing triennial survey that assesses the extent to which 15-year-olds students near the end of compulsory education have acquired key knowledge and skills that are essential for full participation in modern societies. The assessment does not just ascertain whether students can reproduce knowledge; it also examines how well students can extrapolate from what they have learned and apply that knowledge in unfamiliar settings, both in and outside of school. This approach reflects the fact that modern economies reward individuals not for what they know, but for what they can do with what they know.

PISA offers insights for education policy and practice, and helps monitor trends in students' acquisition of knowledge and skills across countries and in different demographic subgroups within each country. The findings allow policy makers around the world to gauge the knowledge and skills of students in their own countries in comparison with those in other countries, set policy targets against measurable goals achieved by other education systems, and learn from policies and practices applied elsewhere.

Key features of PISA 2015

- The PISA 2015 survey focused on science, with reading, mathematics and collaborative problem-solving as minor areas of assessment. For the first time, PISA 2015 delivered the assessment of all subjects via computer. Paper-based assessments were provided for countries that chose not to test their students by computer, but the paper-based assessment was limited to questions that could measure trends in science, reading and mathematics performance.

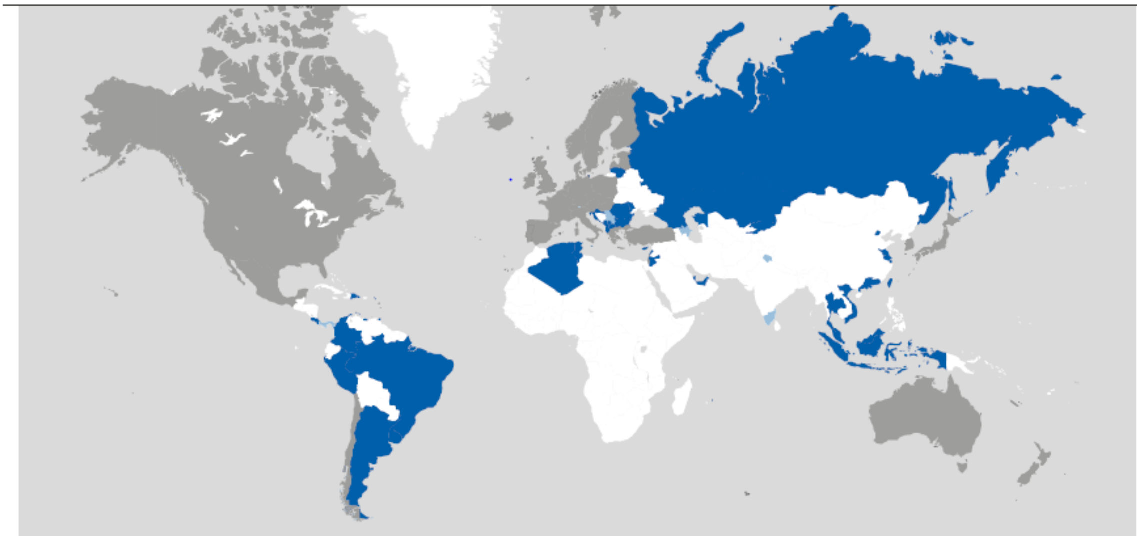
The students

- Around 540 000 students completed the assessment in 2015, representing about 29 million 15-year-olds in the schools of the 72 participating countries and economies.

The assessment

- Computer-based tests were used, with assessments lasting a total of two hours for each student.
- Test items were a mixture of multiple-choice questions and questions requiring students to construct their own responses. The items were organised in groups based on a passage setting out a real-life situation. About 810 minutes of test items were covered, with different students taking different combinations of test items.
- Students also answered a background questionnaire, which took 35 minutes to complete. The questionnaire sought information about the students themselves, their homes, and their school and learning experiences. School principals completed a questionnaire that covered the school system and the learning environment. For additional information, some countries/economies decided to distribute a questionnaire to teachers. It was the first time that this optional teacher questionnaire was offered to PISA-participating countries/economies. In some countries/economies, optional questionnaires were distributed to parents, who were asked to provide information on their perceptions of and involvement in their child's school, their support for learning in the home, and their child's career expectations, particularly in science. Countries could choose two other optional questionnaires for students: one asked students about their familiarity with and use of information and communication technologies (ICT); and the second sought information about students' education to date, including any interruptions in their schooling, and whether and how they are preparing for a future career.

Map of PISA countries and economies



OECD countries

Australia
Austria
Belgium
Canada
Chile
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Japan
Korea
Latvia
Luxembourg
Mexico
The Netherlands
New Zealand
Norway
Poland
Portugal
Slovak Republic
Slovenia
Spain
Sweden
Switzerland
Turkey
United Kingdom
United States

Partner countries and economies in PISA 2015

Albania
Algeria
Argentina
Brazil
B-S-J-G (China)*
Bulgaria
Colombia
Costa Rica
Croatia
Cyprus[1]
Dominican Republic
Former Yugoslav Republic of Macedonia
Georgia
Hong Kong (China)
Indonesia
Jordan
Kazakhstan
Kosovo
Lebanon
Lithuania
Macao (China)
Malaysia
Malta
Moldova
Montenegro
Peru
Qatar
Romania
Russian Federation
Singapore
Chinese Taipei
Thailand
Trinidad and Tobago
Tunisia
United Arab Emirates
Uruguay
Viet Nam

Partner countries and economies in previous cycles

Azerbaijan
Himachal Pradesh-India
Kyrgyzstan
Liechtenstein
Mauritius
Miranda-Venezuela
Panama
Serbia
Tamil Nadu-India

* B-S-J-G (China) refers to the four PISA participating China provinces: Beijing, Shanghai, Jiangsu, Guangdong.

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

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Note regarding data from Israel

The statistical data for Israel are supplied by and are under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

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For more information on the Programme for International Student Assessment and to access the full set of PISA 2015 results, visit:

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