NFER International

NFER Education Briefings

Key insights from international large scale assessments in the Gulf

Education is recognised across the Gulf Cooperation Council (GCC) as a moral imperative and a strategic priority to secure future prosperity and human flourishing. Policymakers have set ambitious targets to join the ranks of the best performing education systems in the world in order to deliver economic success and secure a place on the world stage for their citizens.

International large scale assessments (ILSAs) play an important role in these developments. The GCC nations have demonstrated their commitment to measuring progress against international standards and to playing an active role in the global education community by gathering and sharing data that can be used to inform future improvement.

Coordinated by the IEA and OECD, but delivered separately in each country, studies such as TIMSS, PIRLS and PISA focus on students' achievement in reading, mathematics and science, but they are increasingly branching out into other outcome measures as well. These studies also gather a rich array of additional data on students, schools and the home environment.

Key International Large Scale Assessments

TIMSS is the **Trends in International Mathematics and Science Study**, which looks at mathematics and science learning in Grade 4 (age 10) and Grade 8 (age 14).

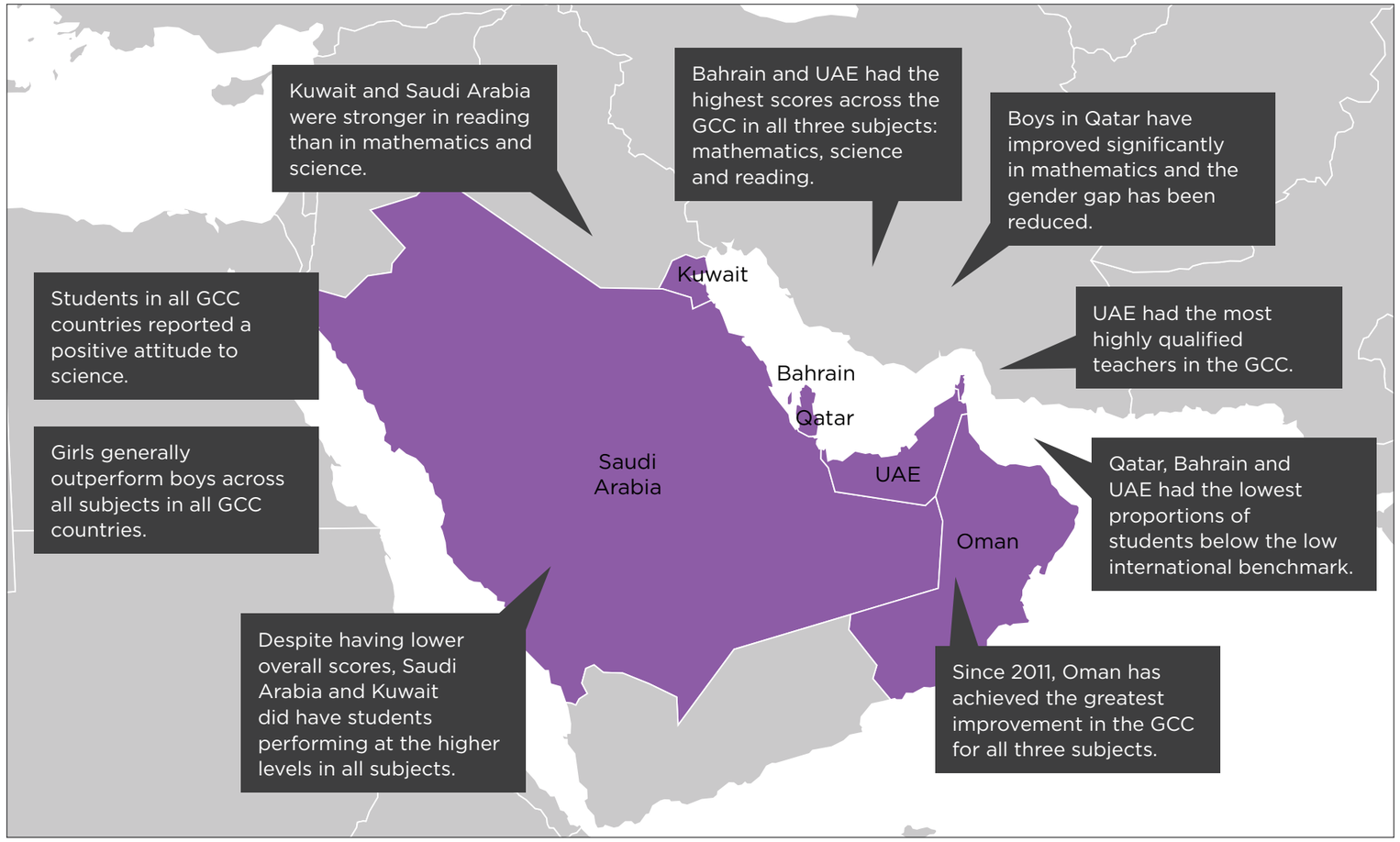
Fifty countries took part in TIMSS 2015, including all six GCC countries.

PIRLS is the **Progress in International Reading Literacy Study**, which examines the reading skills of students in Grade 4 (age 10).

Fifty countries participated in PIRLS 2016, including all six GCC countries.

PISA is the **Programme for International Student Assessment** which assesses 15-year-olds' competencies in reading, mathematics and science every three years.

Seventy-two countries were involved in PISA 2015, including the United Arab Emirates and Qatar.



International Large Scale Assessments in the Gulf

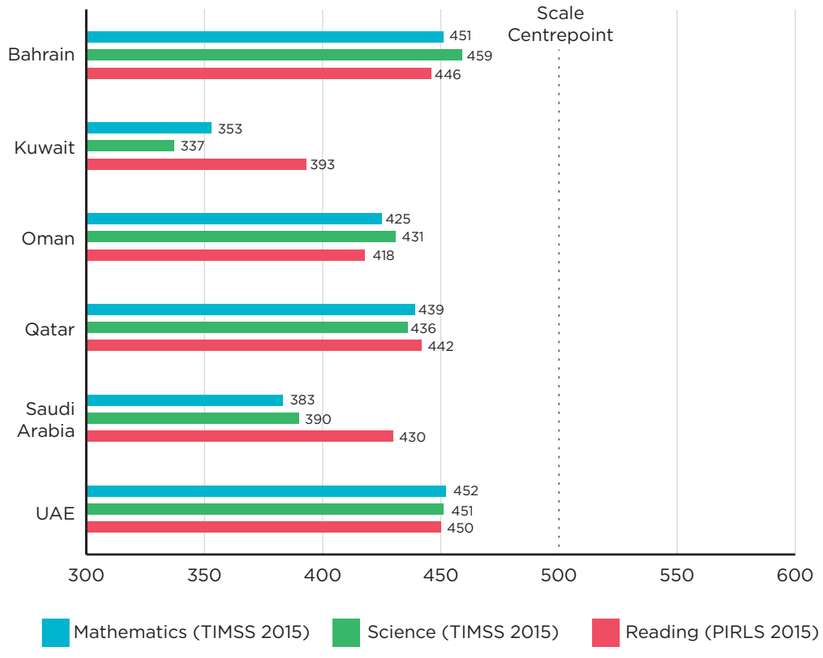
This Education Briefing provides an accessible summary of the key findings from TIMSS, PIRLS, and PISA, and how these compare across the GCC. Its focus is on student performance in the GCC countries at Grade 4, but it also draws on performance at the Grade 8 level and for 15-year-olds in PISA where the data is available.

How do GCC countries compare regionally and globally?

The UAE and Bahrain achieved the highest scores at Grade 4 in the most recent round of studies. For most countries, similar scores were achieved in each subject, although reading ability in Saudi Arabia and Kuwait was notably stronger than ability in mathematics and science.

In these studies, the international centrepoint score is 500. Around two-thirds of students in all participating countries score between 400 and 600 points on the PIRLS and TIMSS assessments.

Grade 4 performance in mathematics, reading and science



> "Each study defines international benchmark levels of achievement, against which each student's skills can be compared"

Mathematics in the Gulf

In 2015, average scores for Grade 4 mathematics ranged from 353 in Kuwait to 452 in UAE.

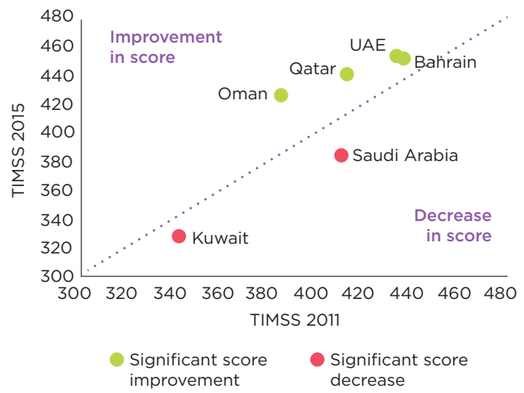
How have mathematics scores changed over time?

All GCC countries took part in TIMSS in 2011 and 2015.

- All GCC countries saw a significant change in 2015 compared with their 2011 scores.
- Bahrain, Oman, Qatar and UAE had a significant improvement in their average attainment score for Grade 4 mathematics. Kuwait and Saudi Arabia saw a significant drop in their average attainment scores.
- Of the GCC countries, Oman had the largest increase in average mathematics score, with a 41-point difference between 2011 and 2015, followed by Qatar with a 26-point increase in its score.

> All GCC countries saw a significant change in 2015

Trend performance in Grade 4 Mathematics from 2011 to 2015



Note: Bahrain 2015[2]; Kuwait 2011 Ж [1]; Kuwait 2015 Ψ; Oman 2011 Ψ; Qatar 2011[2]; Saudi Arabia 2015 Ψ

Key to symbols and annotations

Ж Average achievement not reliably measured because the percentage of students with achievement too low for estimation exceeds 25%.

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

1 National Target Population does not include all of the International Target Population.

2 National Defined Population covers 90% to 95% of the National Target Population

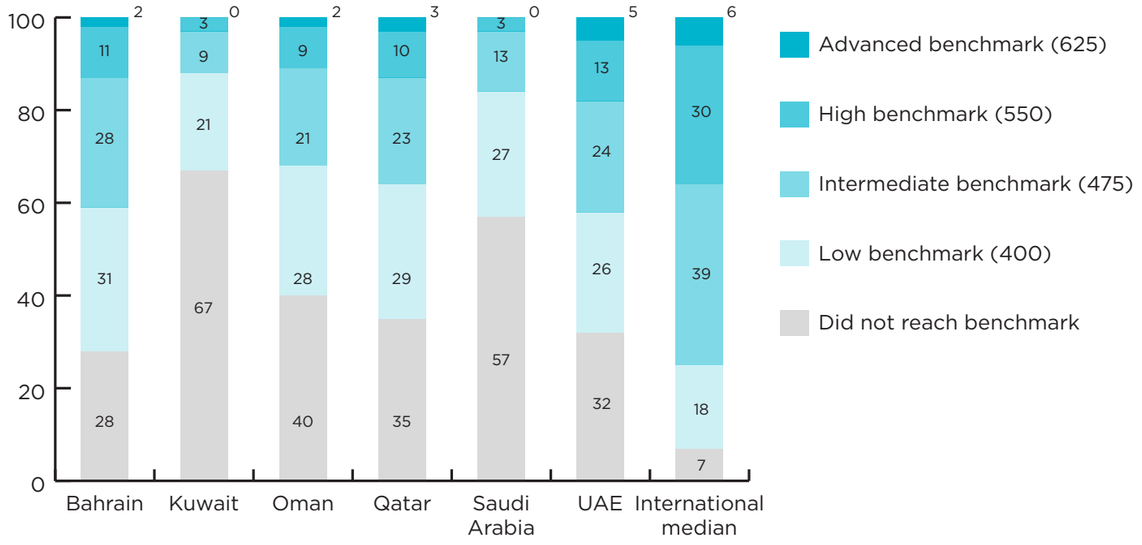
~ Trend information for Kuwait does not include private schools. With the inclusion of private schools for 2015, Kuwait has an average attainment score of 353 for maths and 337 for science however, for consistent trend comparisons, they cannot be included in this graph.

What can International Benchmarks tell us about mathematics performance in the Gulf?

Each study defines international benchmark levels of achievement, against which each student's skills can be compared. (These benchmarks are summarised in the International Benchmarks Table on Page 12.)

- Average scores for Bahrain, Qatar and UAE were between the Low International Benchmark (400) and the Intermediate International Benchmark (475) in both the 2011 and 2015 surveys.
- Oman's overall improvement in mathematics moved it from below the Low International Benchmark score in 2011 to above it in 2015.
- The opposite was seen in Saudi Arabia, where the average attainment score fell from above the Low International Benchmark in 2011 to below it in 2015.
- Overall, there were high achieving students in every GCC country who reached either the High or Advanced International Benchmarks. However, there were many more students in each country who were unable to demonstrate the most basic mathematical skills.
- UAE had the highest percentage of students reaching the Advanced International Benchmark in 2015 (5%), which is close to the international median (6%). However, as in every GCC country, it had a much higher proportion of students not reaching the Low International Benchmark than was seen internationally.

The percentage of students at each International Benchmark for mathematics in 2015



How does TIMSS Grade 4 mathematics trend information compare to TIMSS Grade 8 mathematics?

In all GCC countries, apart from Saudi Arabia, the average Grade 8 attainment score for mathematics was significantly higher in 2015 than in 2011.

Grade 8 International Benchmarks

As with Grade 4 mathematics, the average Grade 8 scores for all GCC countries were lower than the threshold for the Intermediate International Benchmark.

Science in the Gulf

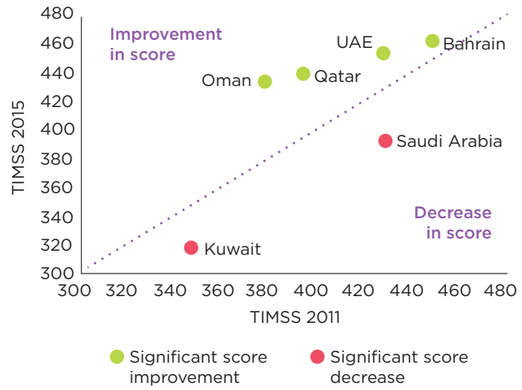
In 2015, average scores for Grade 4 science ranged from 337 in Kuwait to 459 in Bahrain.

How have science scores changed over time?

All GCC countries took part in TIMSS 2011 and 2015.

- All GCC countries saw a significant change in 2015 compared with their 2011 scores.
- Bahrain, Oman, Qatar and UAE had significantly higher average Grade 4 science attainment scores in 2015 than in 2011. Kuwait and Saudi Arabia's average attainment scores significantly decreased.
- As with mathematics, Oman and Qatar had large differences between their scores in each cycle, with Oman seeing a 54-point increase and Qatar a 41-point increase.

Trend performance in Grade 4 science from 2011 to 2015



Note: Bahrain 2015[2]; Kuwait 2011 Ж [1]; Kuwait 2015 Ψ; Qatar 2011[2] See Key to symbols and annotations.

Dubai took part in TIMSS 2015 and PIRLS 2016 as a benchmarking participant. It was the only part of the GCC that scored above the international centrepoint (set at 500) in any subject: mathematics, science or reading. In fact, average scores in Dubai were significantly higher than the international centrepoint for each subject.

Study	Dubai score
TIMSS 2015 Mathematics	
Grade 4	511*
Grade 8	512*
TIMSS 2015 Science	
Grade 4	512*
Grade 8	525*
PIRLS 2016 Reading	**515***

* average significantly higher than the international centrepoint

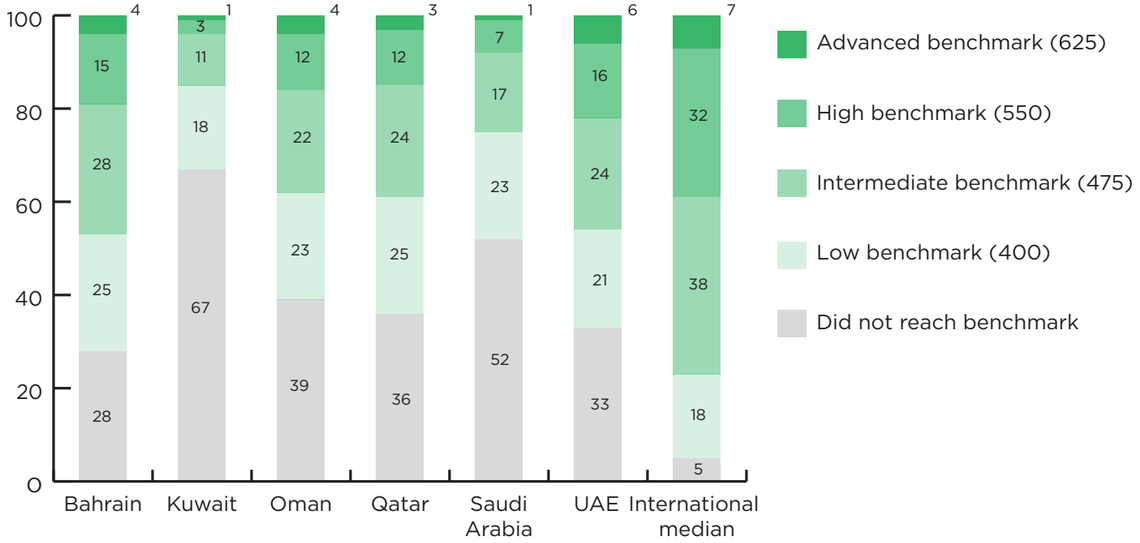
In PISA 2015, compared with international averages, private schools in Dubai scored higher for science, similar for reading and lower for mathematics.

What can International Benchmarks tell us about science performance in the Gulf?

As with mathematics, TIMSS sets four benchmarks in science to provide insight into the extent to which students, at different score levels, can apply and demonstrate their scientific knowledge and skills. (See International Benchmarks Table, Page 12.)

- Despite increases in average science scores across cycles for some GCC countries, the 2015 average scores remained below the threshold for the Intermediate International Benchmark (475).
- Oman and Qatar's improvements in science between 2011 and 2015 brought their mean scores above the Low International Benchmark.
- In all GCC countries, some students reached the Advanced International Benchmark for science in 2015. The proportion in UAE was the greatest among GCC countries (6%) and only one percentage point below the international median (7%).
- Kuwait and Saudi Arabia both had one per cent of students reaching the Advanced International Benchmark in science, with a further 3 and 7 per cent respectively reaching the High International Benchmark.

Percentage of students at each International Benchmark for science



How does TIMSS Grade 4 science trend information compare to TIMSS Grade 8 science?

Kuwait and Saudi Arabia had significantly lower scores in 2015 than in previous cycles.

All other GCC countries had significantly higher average attainment scores for Grade 8 science in 2015 than in 2011.

Grade 8 International Benchmarks

As with Grade 4 science, the average Grade 8 science scores for all GCC countries were below the threshold for the Intermediate International Benchmark.

Reading in the Gulf

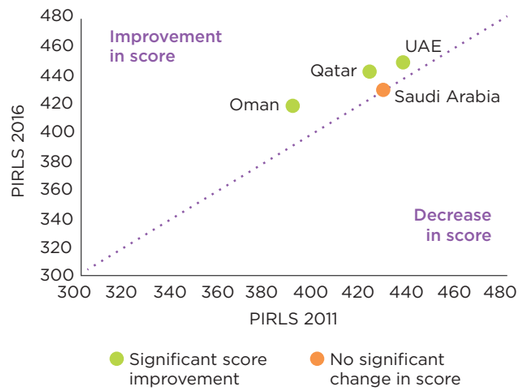
In 2016, average scores for Grade 4 reading in PIRLS 2016 ranged from 393 in Kuwait to 450 in UAE.

How have reading scores changed over time?

PIRLS 2016 was the first cycle that Bahrain and Kuwait had participated in, so no trend information is available. Other GCC countries participated in both cycles.

- Oman, Qatar and UAE significantly improved their average Grade 4 reading attainment scores between 2011 and 2016. For Saudi Arabia, there was no change.
- Oman was the country with the highest increase in average reading attainment between 2011 and 2016 with a 28-point increase.
- No GCC country received an average attainment score above the PIRLS 500 centrepoint.

Trend performance in Grade 4 Reading from 2011 to 2016



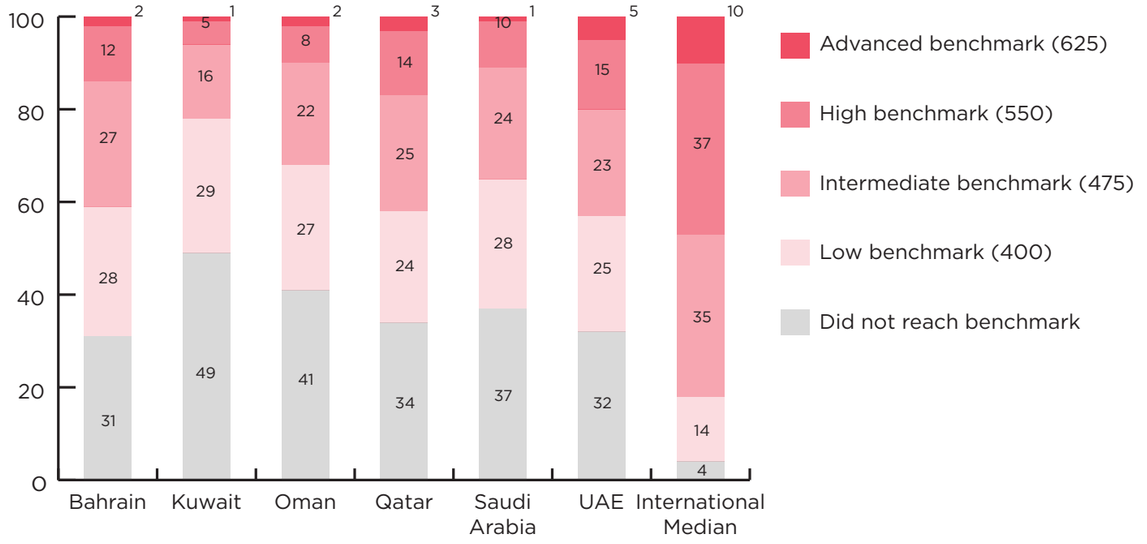
Note: Oman 2011 Ψ; Qatar 2011[2]. See Key to symbols and annotations.

What can International Benchmarks tell us about performance in each GCC country?

As with TIMSS, PIRLS sets four international benchmarks to provide insight into the skills students demonstrate at each level, with relation to reading both literary and informational texts. (See International Benchmarks Table, Page 12.)

- As with mathematics and science, all GCC countries had 2011 and 2016 average PIRLS attainment scores that were below the threshold for the Intermediate International Benchmark.
- The average attainment scores for Kuwait in 2016 and Oman in 2011 were below the Low International Benchmark. Saudi Arabia's average attainment score for reading came above this threshold.
- All GCC countries had a small proportion of their students reaching the Advanced Benchmark in PIRLS 2016, with UAE having the highest proportion.
- Across GCC countries, at least three-in-ten students did not reach the Low International Benchmark; this is much higher than is seen internationally.
- In Kuwait and Saudi Arabia, the proportion of students not reaching the Low Benchmark is noticeably less than the equivalent groups for mathematics and science.

Percentage of students at each International Benchmark for reading in PIRLS 2016



What makes a good reader? (PIRLS 2016)

- More girls than boys are good readers
- Good readers have home environments that support literacy learning
- Good readers had an early start in literacy learning
- Good readers attended well resourced, academically oriented schools
- Good readers attended safe schools
- Reading instruction was a high priority in primary schools internationally
- Good readers attend school regularly and are not tired or hungry
- Good readers had positive attitudes toward reading
- Good readers had little difficulty reading online

Contextual factors

ILSA studies provide the opportunity to consider the attainment data alongside a wealth of contextual data gathered at the same time. Each study includes a selection of questionnaires that gather information from schools, teachers, students and parents, which can be analysed to explore relationships between background factors and achievement.

Girls outperform boys in all GCC countries

Mathematics. At Grade 4, girls perform significantly better except in UAE and Qatar. At Grade 8, significant differences between genders are only seen in Oman and Bahrain.

Science. GCC countries have the highest gender difference at Grade 4 of any countries internationally – from 14 score points difference in favour of girls in UAE to 79 in Saudi Arabia. This difference continues at Grade 8.

Reading. Girls perform better than boys in all participating countries by an average of 19 points globally, and significantly so in all but two countries. GCC countries have some of the biggest differences, ranging from 30 points in UAE to 65 in Saudi Arabia.

- In most instances, GCC countries decreased the 'gender gap' in mathematics and science between 2011 and 2015, with the exception of Bahrain and Saudi Arabia.
- Boys in Qatar showed improved average attainment scores in mathematics between the last two cycles of TIMSS, therefore the gender gap there was significantly reduced.
- The pattern of higher performance of girls was also seen in PISA 2015 in Qatar and UAE. This trend in GCC countries is contrary to international patterns in mathematics and science.
- The gender gap in reading between 2011 and 2016 remained the same or increased for all GCC countries.

Pre-school learning is associated with higher performance in all subjects

Pre-primary education is most common in Bahrain and least common in Saudi Arabia, but in all GCC countries happens less than internationally.

Parents in GCC countries were, however, more likely, than parents internationally, to report that their children could perform simple tasks such as recognising letters, reading sentences, recognising numbers and writing numbers when they began school.

Teacher qualifications vary considerably across GCC countries

Teachers in UAE had the highest qualifications in the GCC, while in Saudi Arabia the proportion of Grade 4 teachers not educated beyond upper secondary level was much higher than internationally.

Grade 8 teachers tended to be more highly qualified but there were still large variations between countries.

In most GCC countries, students were more likely to be taught science by a teacher with a degree qualification than for mathematics.

Inconsistency in levels of teacher qualifications across the GCC countries was also seen in PISA 2015. Nearly all students in UAE had teachers with a university degree or higher, but only 30 per cent did in Qatar. Internationally, the average was around three-quarters.

GCC countries reported high levels of continuing professional development (CPD) among teachers, generally higher than international averages, except in Kuwait.

Students in GCC countries reported very positive attitudes to learning

In the Gulf and internationally, liking the subject had a positive relationship with attainment, with students who liked a subject generally scoring higher than those who do not like it.

Students across the GCC reported enjoying their learning to a greater extent than was found internationally. Students in Oman gave the most positive reports in terms of liking all three subjects.

- Students in most of the GCC countries tend to like science more than mathematics or reading, except in Saudi Arabia, where reading was slightly above science and mathematics.
- Grade 8 students in the GCC were less likely to enjoy learning mathematics but were more positive towards science compared with international patterns.
- A positive attitude towards science in the Gulf was also seen in PISA 2015. Around 40 per cent of students in UAE and Qatar reported that they expected to work in a science-related profession or technical occupation at the age of 30. This was well above the OECD average of 25 per cent.

> All GCC countries had a small proportion of their students reaching the Advanced Benchmark in PIRLS 2016.

International Benchmarks

In order to understand what students know and to what extent they can apply their knowledge, TIMSS and PIRLS set four International Benchmarks (Low, Intermediate, High and Advanced). These Benchmarks have set scores and provide a progressive description of the skills exhibited at each level as summarised below .

International Benchmarks	**Low** at 400 score points	**Intermediate** at 475 score points	**High** at 550 score points	**Advanced** at 625 score points
TIMSS 2015 Mathematics	Students have some basic mathematical knowledge.	Students can apply basic mathematical knowledge in simple situations.	Students can apply their knowledge and understanding to solve problems.	Students can apply their understanding and knowledge in a variety of relatively complex situations and explain their reasoning.
TIMSS 2015 Science	Students show some basic knowledge of life and physical sciences.	Students show basic knowledge and understanding of life, physical, and Earth sciences and can provide simple explanations for biological and physical phenomena.	Students communicate and apply knowledge of the life, physical, and Earth sciences in everyday and abstract contexts.	Students communicate understanding of life, physical, and Earth sciences and demonstrate some knowledge of the process of scientific inquiry.
PIRLS 2016 Reading	Students can locate and retrieve explicitly stated information and begin to make simple inferences.	Students can understand explicitly stated information; make straightforward inferences and begin to interpret and integrate information.	Students can distinguish significant details and make inferences to interpret/explain actions, events, feelings, ideas; recognise some language features.	Students can interpret relatively complex texts, describe/explain motivations and relationships with text based support and begin to evaluate the effect of language and style choices.

Sources: All data presented in this briefing comes from international reports available online at:

TIMSS 2015
http://timss2015.org/timss-2015/mathematics/student-achievement/
http://timss2015.org/timss-2015/science/student-achievement/

PIRLS 2016
http://timssandpirls.bc.edu/pirls2016/international-results/

PISA 2015
http://www.oecd.org/pisa/

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