

Background of TIMSS 2019

The Trends in International Mathematics and Science Study (TIMSS) is conducted under the auspices of the International Association for the Evaluation of Educational Achievement (IEA) to study the achievements in mathematics and science at Grade 4 (equivalent to Primary 4 in Hong Kong) and Grade 8 (equivalent to Secondary 2 in Hong Kong). Against the background information of the participating jurisdictions collected, the Study will find out the factors affecting the learning of these two subjects as well as ways of enhancing the learning effectiveness.

TIMSS has been conducted in a four-year cycle since 1995, and TIMSS 2019 was the seventh round of this international study. Participation in TIMSS provides us with invaluable and reliable trend data to make evidence-based decisions on how to improve teaching and learning in mathematics and science, and also monitors Hong Kong students' achievement trends in an international context.

Hong Kong adopted the computer-based assessment (eTIMSS) in TIMSS 2019. The main study of the Hong Kong component of TIMSS 2019 was conducted from April to July in 2019.

Number of Participating Students

In TIMSS 2019, more than 580,000 students participated in the study. In Hong Kong, a total of 2,968 Primary 4 students from 139 primary schools and 3,265 Secondary 2 students from 136 secondary schools participated in the eTIMSS.

Hong Kong Students' Performance in TIMSS 2019

Mathematics

Hong Kong Primary 4 students ranked second, while Secondary 2 students came fifth. In terms of the scores, Primary 4 students scored 602 and Secondary 2 students scored 578. The two scores were significantly above the international average of 500. The ranking of mathematics performance is shown below:

Grade 4 Mathematics

Country/Region	Average Scale Score
Singapore	625
Hong Kong, China	602
Korea	600
Chinese Taipei	599
Japan	593
Russia	567
Northern Ireland	566
England	556
Ireland	548
Latvia	546
Norway	543
Lithuania	542
Austria	539
Netherlands	538
United States of America	535
Czech Republic	533
Belgium (Flemish)	532
Cyprus	532
Finland	532
Portugal	525
Denmark	525
Hungary	523
Turkey	523
Sweden	521
Germany	521
Poland	520
Australia	516
Azerbaijan	515
Bulgaria	515
Italy	515
Kazakhstan	512
Canada	512
Slovak Republic	510
Croatia	509
Malta	509
Serbia	508
Spain	502
TIMSS Scale Average	500
Armenia	498
Albania	494
New Zealand	487
France	485
Georgia	482
United Arab Emirates	481
Bahrain	480
North Macedonia	472
Montenegro	453
Bosnia and Herzegovina	452
Qatar	449
Kosovo	444
Iran	443
Chile	441
Oman	431
Saudi Arabia	398
Morocco	383
Kuwait	383
South Africa	374
Pakistan	328
Philippines	297

Grade 8 Mathematics

Country/Region	Average Scale Score
Singapore	616
Chinese Taipei	612
Korea	607
Japan	594
Hong Kong, China	578
Russia	543
Ireland	524
Lithuania	520
Israel	519
Australia	517
Hungary	517
United States of America	515
England	515
Finland	509
Norway	503
Sweden	503
Cyprus	501
Portugal	500
TIMSS Scale Average	500
Italy	497
Turkey	496
Kazakhstan	488
France	483
New Zealand	482
Bahrain	481
Romania	479
United Arab Emirates	473
Georgia	461
Malaysia	461
Iran	446
Qatar	443
Chile	441
Lebanon	429
Jordan	420
Egypt	413
Oman	411
Kuwait	403
Saudi Arabia	394
South Africa	389
Morocco	388

Grade 4 Science

Country/Region	Average Scale Score
Singapore	595
Korea	588
Russia	567
Japan	562
Chinese Taipei	558
Finland	555
Latvia	542
Norway	539
United States of America	539
Lithuania	538
Sweden	537
England	537
Czech Republic	534
Australia	533
Hong Kong, China	531
Poland	531
Hungary	529
Ireland	528
Turkey	526
Croatia	524
Canada	523
Denmark	522
Austria	522
Bulgaria	521
Slovak Republic	521
Northern Ireland	518
Netherlands	518
Germany	518
Serbia	517
Cyprus	511
Spain	511
Italy	510
Portugal	504
New Zealand	503
Belgium (Flemish)	501
TIMSS Scale Average	500
Malta	496
Kazakhstan	494
Bahrain	493
Albania	489
France	488
United Arab Emirates	473
Chile	469
Armenia	466
Bosnia and Herzegovina	459
Georgia	454
Montenegro	453
Qatar	449
Iran	441
Oman	435
Azerbaijan	427
North Macedonia	426
Kosovo	413
Saudi Arabia	402
Kuwait	392
Morocco	374
South Africa	324
Pakistan	290
Philippines	249

Science

Hong Kong Primary 4 and Secondary 2 students ranked 15th and 17th respectively. In terms of the scores, Primary 4 students scored 531 and Secondary 2 students scored 504. The two scores were above the international average of 500. The ranking of science performance is shown below:

Grade 8 Science

Country/Region	Average Scale Score
Singapore	608
Chinese Taipei	574
Japan	570
Korea	561
Russia	543
Finland	543
Lithuania	534
Hungary	530
Australia	528
Ireland	523
United States of America	522
Sweden	521
Portugal	519
England	517
Turkey	515
Israel	513
Hong Kong, China	504
Italy	500
TIMSS Scale Average	500
New Zealand	499
Norway	495
France	489
Bahrain	486
Cyprus	484
Kazakhstan	478
Qatar	475
United Arab Emirates	473
Romania	470
Chile	462
Malaysia	460
Oman	457
Jordan	452
Iran	449
Georgia	447
Kuwait	444
Saudi Arabia	431
Morocco	394
Egypt	389
Lebanon	377
South Africa	370

International Benchmarks of Achievement

To provide an interpretation of the results on the TIMSS achievement scale in relation to the students' performance on the assessment items, TIMSS describes achievement at four points along the scale as international benchmarks: advanced benchmark (625), high benchmark (550), intermediate benchmark (475), and low benchmark (400).

Mathematics

The proportion of Primary 4 and Secondary 2 students reaching the advanced benchmark in the subject was 38% and 32% respectively, which was well above the international median of 7% and 5%. Hong Kong students have maintained their outstanding performance in mathematics overall. The percentages of Hong Kong students reaching each benchmark of mathematics achievement are summarized below:

Mathematics	Primary 4	Grade 4 International Median	Secondary 2	Grade 8 International Median
Advanced Benchmark (625)	38%	7%	32%	5%
High Benchmark (550)	78%	34%	66%	25%
Intermediate Benchmark (475)	96%	71%	87%	56%
Low Benchmark (400)	100%	92%	96%	87%

Science

The proportion of Primary 4 and Secondary 2 students reaching the advanced benchmark in the subject was 8% and 9% respectively, slightly higher than the international median of 6% and 7%. The percentages of Hong Kong students reaching each benchmark of science achievement are summarized below:

Science	Primary 4	Grade 4 International Median	Secondary 2	Grade 8 International Median
Advanced Benchmark (625)	8%	6%	9%	7%
High Benchmark (550)	41%	32%	33%	29%
Intermediate Benchmark (475)	79%	71%	64%	61%
Low Benchmark (400)	96%	92%	85%	85%

Achievement in Content and Cognitive Domains

The content domains (for example, algebra, geometry in mathematics, and biology, chemistry in science) with specific objectives are described separately for the fourth and eighth grades. The cognitive domains of knowing, applying, and reasoning describe the thinking skills students are expected to use as they engage with the mathematics and science content.

Achievement in Mathematics

Primary 4		Secondary 2	
Overall Average Scale Score	602	Overall Average Scale Score	578
Content Domains			
Number	598	Number	570
Measurement and Geometry	608	Algebra	584
Data	607	Geometry	596
		Data and Probability	563
Cognitive Domains			
Knowing	600	Knowing	580
Applying	606	Applying	575
Reasoning	596	Reasoning	582

Achievement in Science

Primary 4		Secondary 2	
Overall Average Scale Score	531	Overall Average Scale Score	504
Content Domains			
Life Science	523	Biology	501
Physical Science	529	Chemistry	485
Earth Science	549	Physics	510
		Earth Science	512
Cognitive Domains			
Knowing	537	Knowing	501
Applying	526	Applying	501
Reasoning	531	Reasoning	504

Source:

TIMSS 2019 International Results in Mathematics and Science. Available from:

<https://timssandpirls.bc.edu/timss2019/>.