

# The Hong Kong Component of Trends in International Mathematics and Science Study (TIMSS) 2019

**Thematic Webinar**  
**Event AB (Secondary)**

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**Dr. Maurice Cheng (University of Waikato, NZ; HKU)**

**December 14, 2020**

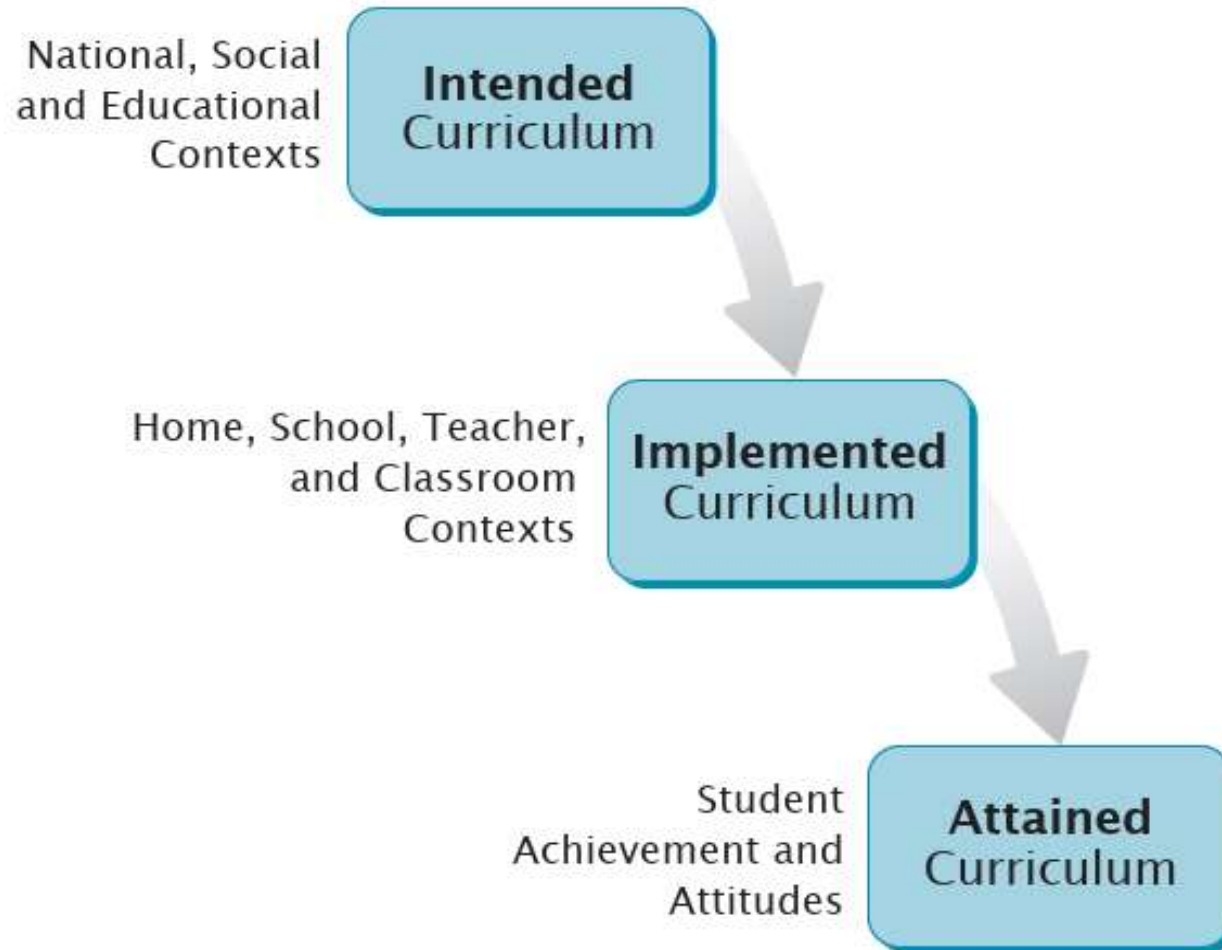
# Background of TIMSS 2019

- ❖ TIMSS is conducted under the auspices of the International Association for the Evaluation of Educational Assessment (IEA)
- ❖ It is an international assessment of student achievement in mathematics and science at Grades 4 (Primary 4) and 8 (Secondary 2)
- ❖ TIMSS 2019 is the 7<sup>th</sup> cycle of the TIMSS assessments since 1995
- ❖ It monitors 24 years of trends in educational achievement and contexts for learning mathematics and science



# TIMSS Curriculum Model

## TIMSS Curriculum Model



# Participating countries/regions

- ❖ 64 participating countries/regions and 8 benchmarking entities participated in TIMSS 2019
- ❖ 58 countries/regions & 6 benchmarking entities participated in the 4<sup>th</sup> grade assessment
- ❖ 39 countries/regions & 7 benchmarking entities participated in the 8<sup>th</sup> grade assessment
- ❖ More than 580,000 Grades 4 and 8 students were tested worldwide

# From paperTIMSS to eTIMSS

- ❖ TIMSS 2019 is transitioning from paper-and-pencil test (paperTIMSS) to computer-based assessment (eTIMSS)
- ❖ Transitioning to eTIMSS is to:
  - reflect the growing use of digital devices in school and everyday life
  - keep pace with an increasing worldwide reliance on digital communication and assessment
  - enable participating countries to capitalize on the benefits of technology to ask students to solve mathematics problems and conduct science investigations in interactive situations



# eTIMSS 2019

- ❖ eTIMSS is an engaging, interactive assessment that encompasses the content of the paper-and-pencil version of TIMSS and additional innovative Problem Solving and Inquiry tasks, known as PSIs
- ❖ The PSIs simulate real world and laboratory situations where students can integrate and apply process skills and content knowledge to solve mathematics problems and conduct scientific experiments or investigations
- ❖ eTIMSS 2019 Demo Video: [eTIMSS video.mov](#)

# Bridge Study in TIMSS 2019

- ❖ To provide a bridge between eTIMSS & paperTIMSS, trend items were administered to a separate sample of students in the same school
- ❖ The bridge data form an intermediate link between eTIMSS 2019 and the paper-based data in 2015
- ❖ A substantial percentage of equivalent/invariant items between paperTIMSS and eTIMSS were administered following a randomly equivalent groups design, so achievement differences between them are likely to be due to a “mode effect”



# eTIMSS Item Equivalence

## eTIMSS 2019 Fourth Grade Item Equivalence

Item Type		Mathematics			Science		
		Trend	New	Total	Trend	New	Total
Equivalent Items	Multiple Choice Items	41	24	65	47	39	86
	Keyboard Items	3	3	6	39	22	61
	Number Pad Items	30	22	52	—	—	—
<b>All Equivalent Items</b>		<b>74</b>	<b>49</b>	<b>123</b>	<b>86</b>	<b>61</b>	<b>147</b>
<b>All Non–Equivalent Items</b>		<b>18</b>	<b>30</b>	<b>48</b>	<b>9</b>	<b>13</b>	<b>22</b>
<b>All Items</b>		<b>92</b>	<b>79</b>	<b>171</b>	<b>95</b>	<b>74</b>	<b>169</b>
<b>Percentage of Equivalent Items</b>		<b>80%</b>	<b>62%</b>	<b>72%</b>	<b>91%</b>	<b>82%</b>	<b>87%</b>

## eTIMSS 2019 Eighth Grade Item Equivalence

Item Type		Mathematics			Science		
		Trend	New	Total	Trend	New	Total
Equivalent Items	Multiple Choice Items	60	26	86	58	44	102
	Keyboard Items	9	10	19	47	26	73
	Number Pad Items	33	29	62	2	1	3
<b>All Equivalent Items</b>		<b>102</b>	<b>65</b>	<b>167</b>	<b>107</b>	<b>71</b>	<b>178</b>
<b>All Non–Equivalent Items</b>		<b>12</b>	<b>27</b>	<b>39</b>	<b>9</b>	<b>13</b>	<b>22</b>
<b>All Items</b>		<b>114</b>	<b>92</b>	<b>206</b>	<b>116</b>	<b>84</b>	<b>200</b>
<b>Percentage of Equivalent Items</b>		<b>89%</b>	<b>71%</b>	<b>81%</b>	<b>92%</b>	<b>85%</b>	<b>89%</b>



# Bridge and eTIMSS Invariant Items

**Exhibit 6: eTIMSS 2019 International Average Percent Correct on Paper Bridge and eTIMSS Invariant Items**

Grade 4	Bridge	eTIMSS	Difference	z- test
Mathematics	53.42 (0.23)	50.77 (0.13)	2.65 (0.26)	B>E (0.05)
Science	51.51 (0.20)	49.69 (0.11)	1.82 (0.23)	B>E (0.05)
Grade 8	Bridge	eTIMSS	Difference	z- test
Mathematics	47.37 (0.33)	43.72 (0.18)	3.66 (0.38)	B>E (0.05)
Science	47.81 (0.27)	45.72 (0.16)	2.09 (0.31)	B>E (0.05)

B>E indicates the bridge students performed significantly higher than the eTIMSS students ( $\alpha = 0.05$ ).



# TIMSS 2019 in Hong Kong

- ❖ Hong Kong participated in TIMSS 1995, 1999, 2003, 2007, 2011, 2015 and 2019
- ❖ The Hong Kong samples included students from local and non-local schools
- ❖ 139 primary schools and 136 secondary schools participated in TIMSS 2019 in Hong Kong
- ❖ 2968 Primary 4 students and 3265 Secondary 2 students were tested in eTIMSS
- ❖ Avg. age of Primary 4 students tested: 10.1 years old
- ❖ Avg. age of Secondary 2 students tested: 14.1 years old

# TIMSS 2019 FINDINGS



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# TIMSS 2019

## SCIENCE ACHIEVEMENT



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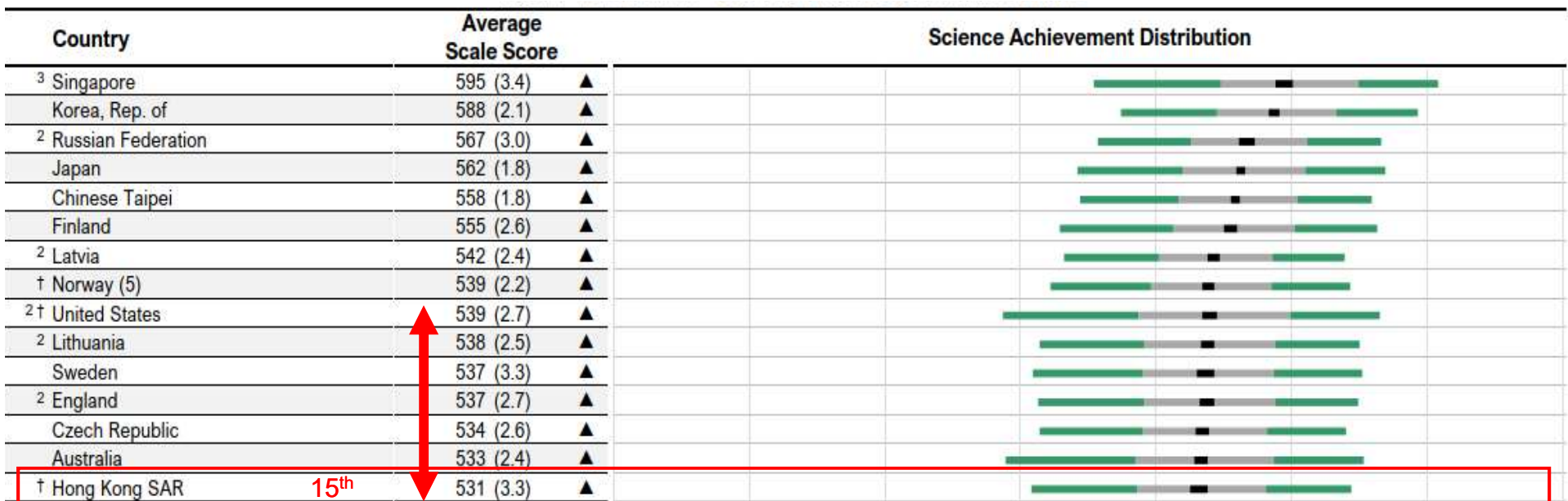
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# Primary 4 Science

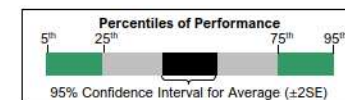
Science • Grade 4



Exhibit 2.1: Average Science Achievement and Scale Score Distributions



9<sup>th</sup>-20<sup>th</sup>: no stat. signif diff



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# Hong Kong Results in TIMSS 2019

## ❖ Science (TIMSS Scale Average: 500)

P.4: TIMSS scale score: 531 (15<sup>th</sup>)

(Singapore: 595 (1<sup>st</sup>), Korea: 588 (2<sup>nd</sup>), Russia: 567 (3<sup>rd</sup>), Japan: 562 (4<sup>th</sup>), Chinese Taipei: 558 (5<sup>th</sup>), Finland: 555 (6<sup>th</sup>), Latvia: 542 (7<sup>th</sup>), Norway: 539 (8<sup>th</sup>), United States of America: 539 (9<sup>th</sup>), Lithuania: 538 (10<sup>th</sup>), Sweden: 537 (11<sup>th</sup>), England: 537 (12<sup>th</sup>), Czech Republic: 534 (13<sup>th</sup>), Australia: 533 (14<sup>th</sup>), Poland: 531 (16<sup>th</sup>), Hungary: 529 (17<sup>th</sup>), Ireland: 528 (18<sup>th</sup>), Turkey: 526 (19<sup>th</sup>), Croatia: 524 (20<sup>th</sup>))

(\*No sign. diff. in achievement between 9<sup>th</sup> and 20<sup>th</sup> places)



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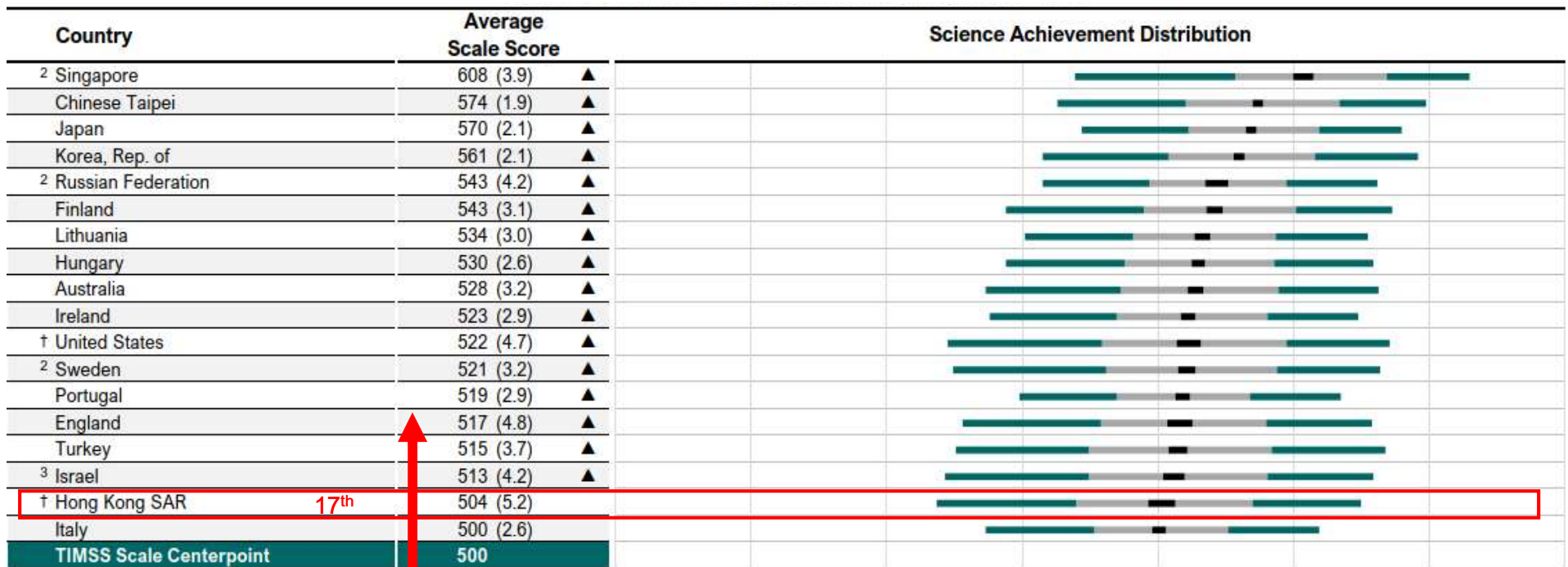


# Secondary 2 Science

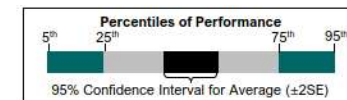
Science • Grade 8



Exhibit 4.1: Average Science Achievement and Scale Score Distributions



14<sup>th</sup>-20<sup>th</sup>: no stat. signif diff



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# Hong Kong Results in TIMSS 2019

## ❖ Science (TIMSS Scale Average: 500)

S.2: TIMSS scale score: 504 (17<sup>th</sup>)

(Singapore: 608 (1<sup>st</sup>), Chinese Taipei: 574 (2<sup>nd</sup>), Japan: 570 (3<sup>rd</sup>), Korea: 561 (4<sup>th</sup>), Russia: 543 (5<sup>th</sup>), Finland: 543 (6<sup>th</sup>), Lithuania: 534 (7<sup>th</sup>), Hungary: 530 (8<sup>th</sup>), Australia: 528 (9<sup>th</sup>), Ireland: 523 (10<sup>th</sup>), United States of America: 522 (11<sup>th</sup>), Sweden: 521 (12<sup>th</sup>), Portugal: 519 (13<sup>th</sup>), England: 517 (14<sup>th</sup>), Turkey: 515 (15<sup>th</sup>), Israel: 513 (16<sup>th</sup>), Italy: 500 (18<sup>th</sup>), New Zealand: 499 (19<sup>th</sup>), Norway: 495 (20<sup>th</sup>))

(\*No sign. diff. in achievement between 14<sup>th</sup> and 20<sup>th</sup> places)

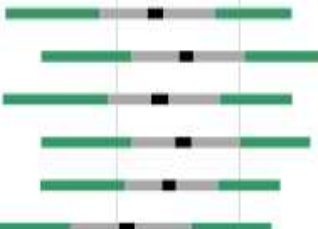


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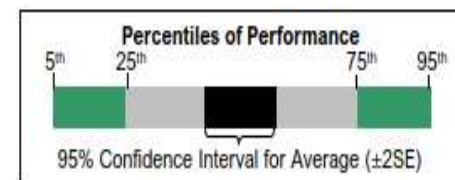
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# Trends in Hong Kong Achievement (Primary 4)

Country	Average Scale Score	Differences Between Years					Science Achievement Distribution
		2015	2011	2007	2003	1995	
Hong Kong SAR							
† 2019	531 (3.3)	-25 ▽	-4	-23 ▽	-11 ▽	23 ▲	
† 2015	557 (2.9)		22 ▲	2	14 ▲	49 ▲	
<sup>2</sup> 2011	535 (3.7)			-19 ▽	-8	27 ▲	
2007	554 (3.5)				12 ▲	46 ▲	
† 2003	542 (3.0)					35 ▲	
1995	508 (3.4)						

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

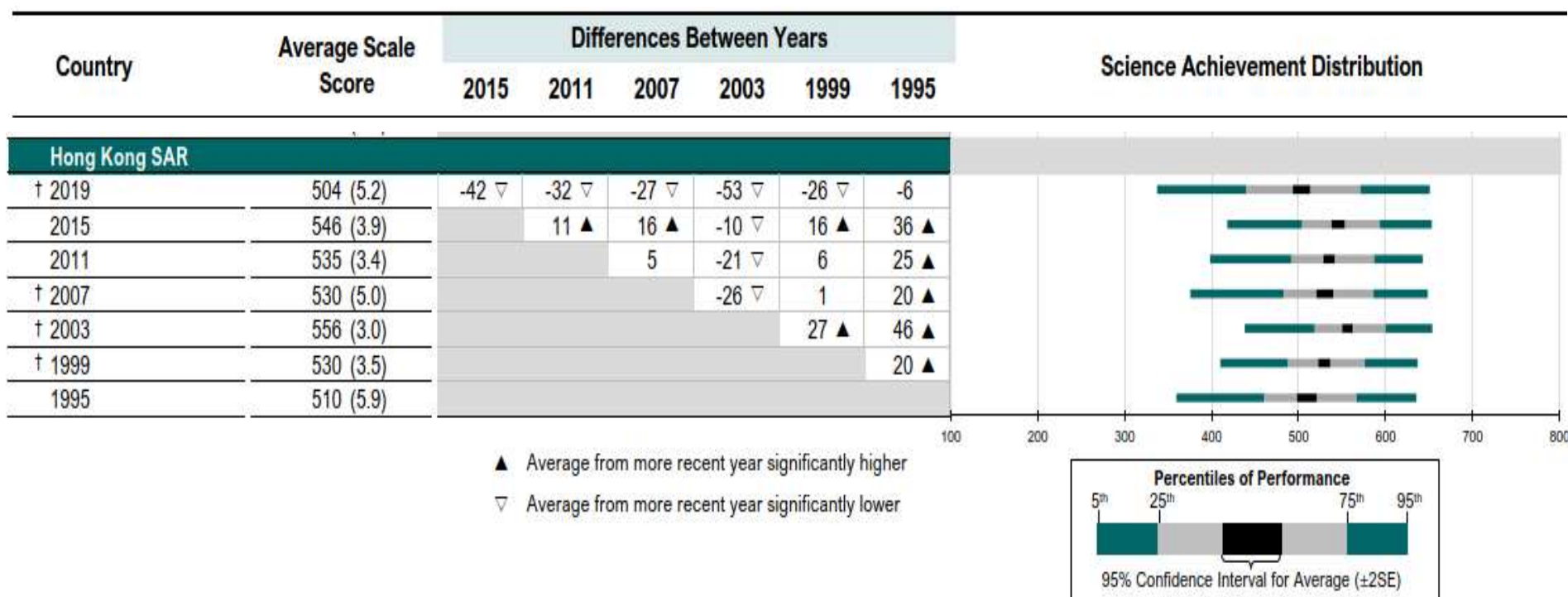


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# Trends in Hong Kong Achievement (Secondary 2)



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# INTERNATIONAL BENCHMARKS OF SCIENCE

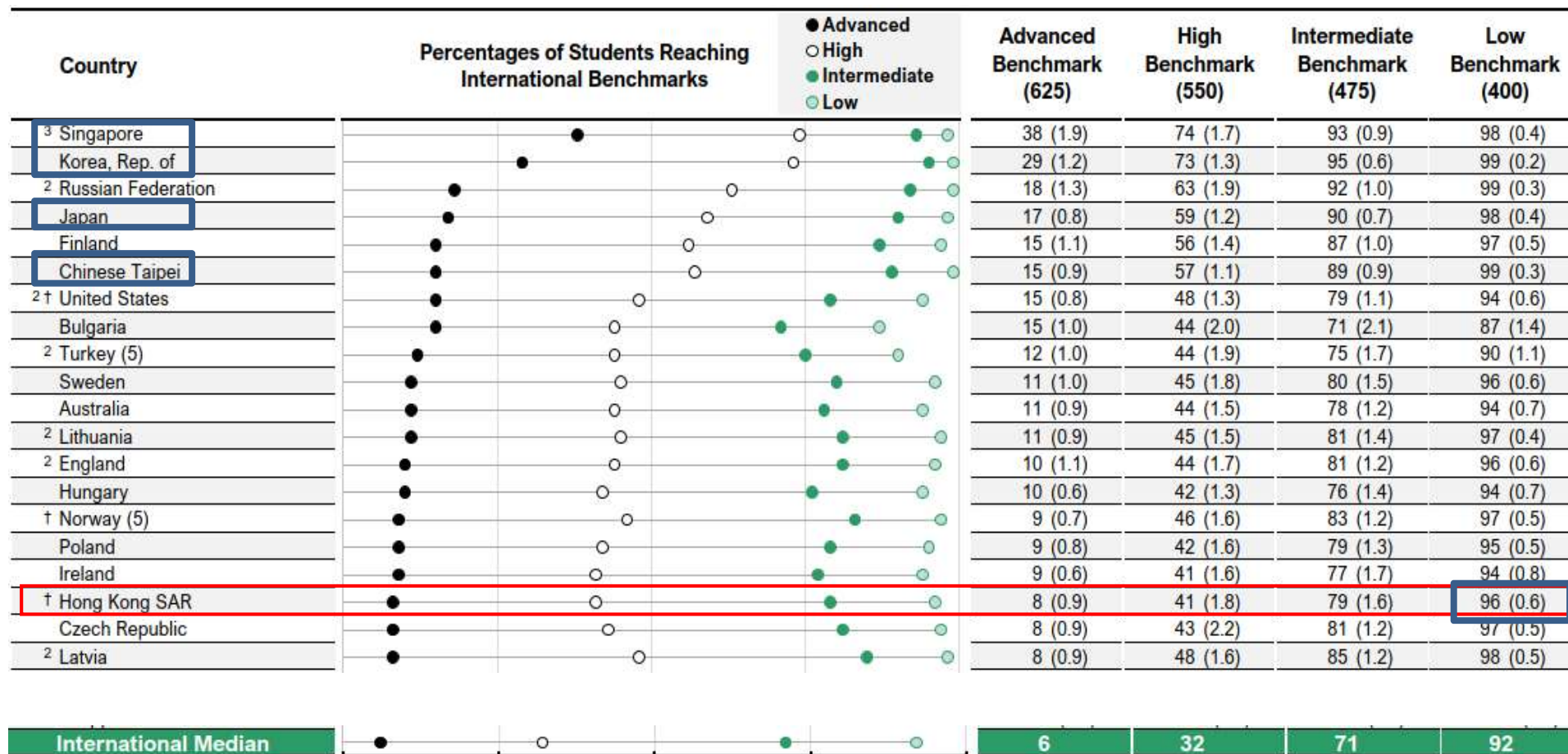


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# International Benchmarks (P4)





# International Benchmarks: Trend

Percentages of Students Reaching the International Benchmarks of Science Achievement Across Assessment Years (Primary 4)

	Advanced	High	Intermediate	Low
<b>Primary 4</b>				
2019	8%	41%	79%	96%
2015	16%#	55%#	88%#	98%#
2011	9%	45%	82%	96%
2007	14%#	55%#	88%#	98%#
2003	7%	47%#	87%#	98%#
1995	5%*	30%*	69%*	91%*

\*TIMSS 2019 percent significantly higher

# TIMSS 2019 percent significantly lower

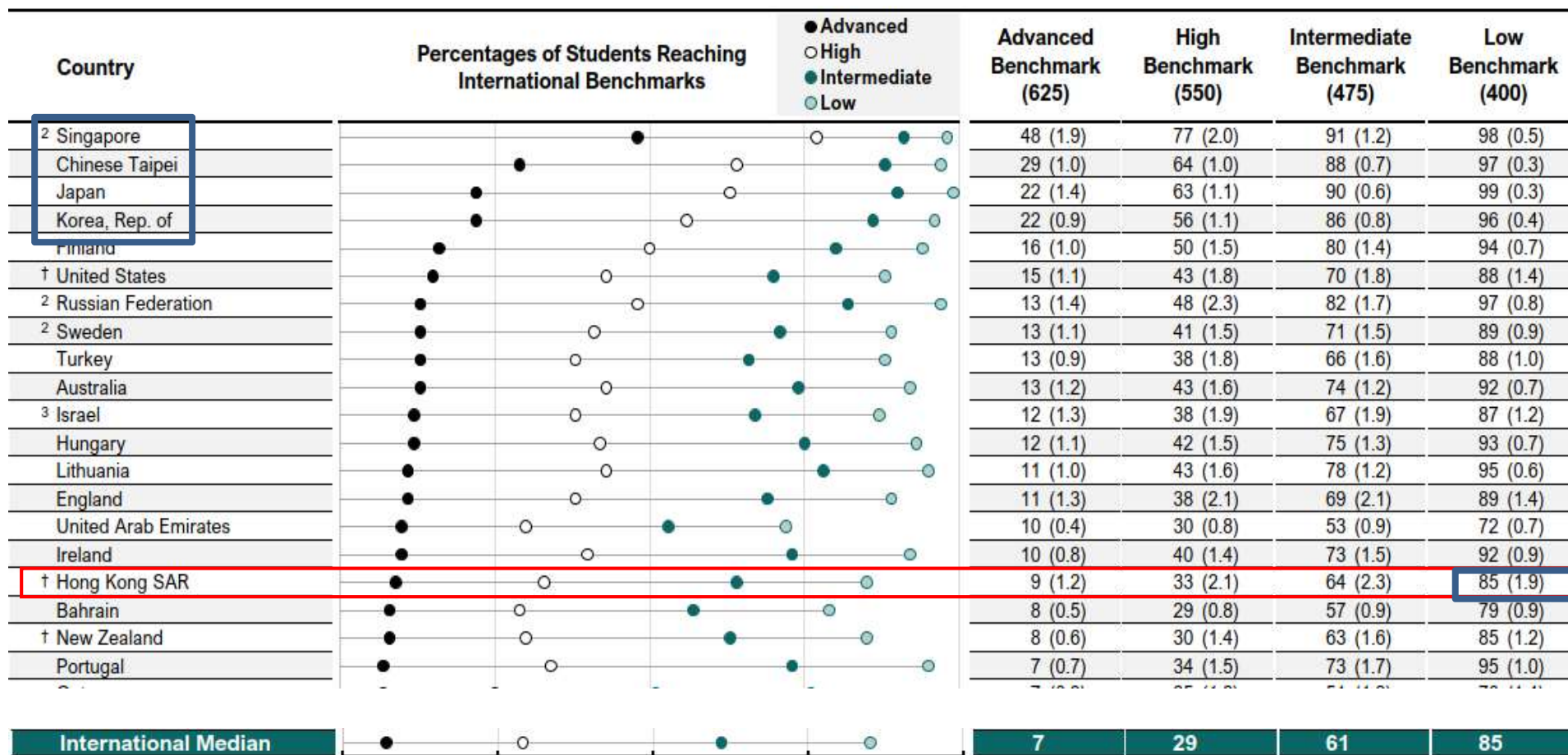


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# International Benchmarks (S2)





## ❖ Example of an Intermediate Benchmark Item – Secondary 2

Country	Percent Correct	
<sup>2</sup> Singapore	90 (1.2)	▲
Korea, Rep. of	86 (1.5)	▲
Hungary	84 (1.4)	▲
Ireland	84 (1.7)	▲
<sup>2</sup> Russian Federation	81 (2.1)	▲
Australia	80 (1.6)	▲
Italy	80 (2.0)	▲
England	80 (2.0)	▲
† Norway (9)	79 (1.9)	▲
Cyprus	77 (1.9)	▲
Lithuania	77 (2.1)	▲
† New Zealand	76 (1.8)	▲
† United States	74 (2.4)	▲
Chinese Taipei	74 (1.7)	▲
Finland	73 (1.8)	▲
Portugal	73 (2.6)	
<sup>2</sup> Sweden	72 (2.1)	
Malaysia	72 (1.9)	
<sup>3</sup> Israel	71 (2.1)	
Oman	71 (1.9)	
Bahrain	70 (1.9)	
Romania	69 (2.2)	
<b>International Average</b>	<b>69 (0.3)</b>	
Japan	68 (1.7)	
Iran, Islamic Rep. of	67 (1.9)	
Chile	67 (2.6)	
France	67 (2.3)	
Turkey	67 (2.1)	
Qatar	66 (2.2)	
Jordan	65 (2.1)	
Kuwait	65 (2.5)	
United Arab Emirates	65 (1.1)	▼
† Hong Kong SAR	61 (2.7)	▼

**Content Domain:** Physics

**Cognitive Domain:** Knowing

**Description:** Recognizes why a vehicle has a different weight on Mars than it does on Earth

Scientists sent a special vehicle to Mars to make a map of the surface of the planet. A diagram of the vehicle is shown.



The vehicle has a different weight on Mars than it has on the Earth.

Why does the vehicle have different weights on the two planets?

- A** The vehicle lost mass when it was transported from Earth to Mars.
- B** The vehicle gained mass when it began moving on Mars.
- C** The magnetic attraction on Earth is different from Mars.
- D** The gravitational attraction on Earth is different from Mars.

## ❖ Example of a High Benchmark Item – Secondary 2

Country	Percent Full Credit
Chinese Taipei	78 (1.8) ▲
Turkey	61 (2.1) ▲
<sup>2</sup> Singapore	59 (2.5) ▲
Japan	56 (2.2) ▲
Lithuania	56 (2.8) ▲
Korea, Rep. of	53 (2.6) ▲
Malaysia	52 (2.0) ▲
† Hong Kong SAR	51 (3.3) ▲
Qatar	50 (2.8) ▲
Jordan	46 (2.3) ▲
<sup>2</sup> Sweden	46 (2.3) ▲
France	44 (2.5) ▲
Finland	44 (2.1) ▲
Hungary	43 (2.2) ▲
<sup>2</sup> Russian Federation	42 (2.8)
<sup>2</sup> Kazakhstan	42 (2.0)
<sup>2</sup> Saudi Arabia	41 (2.2)
<sup>1</sup> Georgia	40 (2.8)
United Arab Emirates	39 (1.1)
<b>International Average</b>	<b>38 (0.4)</b>
Portugal	38 (2.7)
† United States	37 (2.3)
Cyprus	36 (2.4)
England	35 (2.8)
Oman	33 (1.9) ▼
Australia	33 (2.1) ▼
Kuwait	33 (2.8) ▼
Ireland	33 (2.3) ▼
<sup>2</sup> Egypt	32 (2.0) ▼
† New Zealand	31 (2.1) ▼

**Content Domain:** Physics

**Cognitive Domain:** Applying

**Description:** Applies knowledge of sound transmission to explain whether a ringing cell phone in a vacuum can be heard outside the vacuum chamber

Nada hangs her cell phone under a glass bowl as shown. The ringer on the phone is turned on. She removes the air from under the bowl so that her phone is in a vacuum.



Nada asks her friend to call her phone. Will they hear it ring?

(Click one box.)

☐ Yes

☒ No

Explain your answer.

There is no air under the bowl for the sound waves to travel through.



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## ❖ Example of an Advanced Benchmark Item – Secondary 2

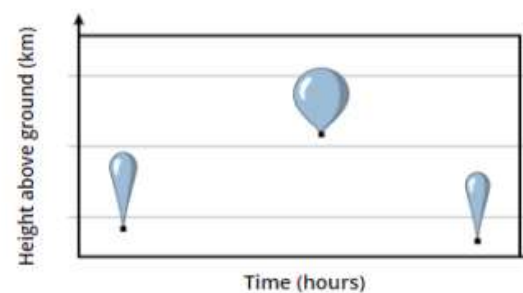
Country	Percent Correct	
Japan	68 (1.9)	▲
<sup>2</sup> Russian Federation	66 (2.6)	▲
Lithuania	65 (2.0)	▲
Korea, Rep. of	63 (2.2)	▲
Chinese Taipei	63 (2.0)	▲
Turkey	62 (2.4)	▲
<sup>2</sup> Kazakhstan	57 (2.4)	▲
Finland	55 (2.0)	▲
Hungary	52 (2.3)	▲
Bahrain	51 (2.0)	▲
† Hong Kong SAR	50 (2.5)	▲
France	49 (2.1)	▲
Italy	45 (2.8)	
<sup>2</sup> Singapore	45 (2.1)	
Romania	43 (2.3)	
England	42 (2.6)	
<b>International Average</b>	<b>42 (0.3)</b>	
<sup>1</sup> Georgia	42 (3.0)	
<sup>2</sup> Saudi Arabia	42 (2.0)	
Australia	41 (1.9)	
† United States	40 (1.8)	
Portugal	40 (2.1)	
United Arab Emirates	39 (1.0)	▽
† Norway (9)	39 (2.4)	
Qatar	37 (2.0)	▽
Ireland	36 (2.0)	▽
<sup>2</sup> Sweden	35 (2.2)	▽
<sup>3</sup> Israel	35 (2.7)	▽
† New Zealand	34 (2.5)	▽
Oman	34 (1.8)	▽

**Content Domain:** Earth Science

**Cognitive Domain:** Knowing

**Description:** Recognizes why a balloon gets bigger as its height above the ground increases

The diagram shows the height above the ground of a helium-filled weather balloon during a period of several hours.



What causes the balloon to become bigger as its height above the ground increases?

- A** Gravity decreases.
- B** Atmospheric pressure decreases.
- C** The balloon is heated by the Sun.
- D** The balloon absorbs air.



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# International Benchmarks: Trend

Percentages of Students Reaching the International Benchmarks of Science Achievement Across Assessment Years (Secondary 2)

Secondary 2	Advanced	High	Intermediate	Low
2019	9%	33%	64%	85%
2015	12%	51%#	85%#	96%#
2011	9%	47%#	80%#	95%#
2007	10%	45%#	77%#	92%#
2003	13%*	58%#	89%#	98%#
1999	7%	40%#	80%#	96%#
1995	7%	33%	70%	90%

\*TIMSS 2019 percent significantly higher

# TIMSS 2019 percent significantly lower



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# GENDER AND SCIENCE ACHIEVEMENT



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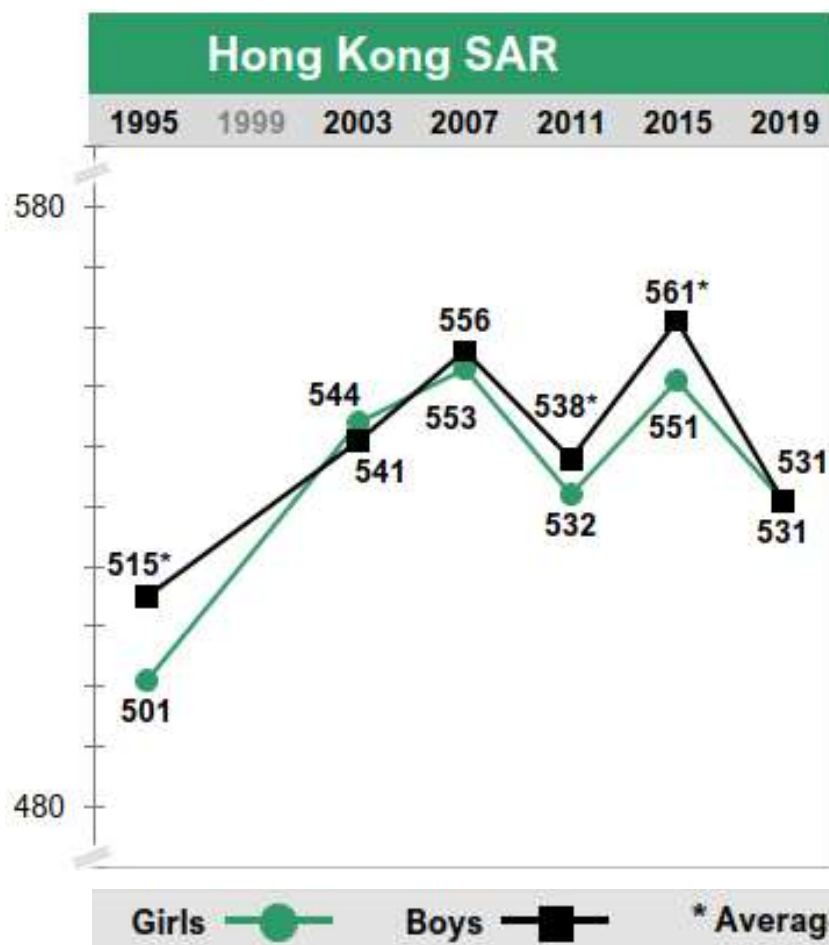
Country	Girls		Boys		Difference (Absolute Value)	Gender Difference	
	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score		Girls Scored Higher	Boys Scored Higher
<sup>2</sup> Saudi Arabia	48 (0.8)	434 (4.8)	52 (0.8)	373 (6.5)	60 (8.3)		
Kuwait	47 (2.6)	413 (6.9)	53 (2.6)	374 (8.7)	39 (10.3)		
<sup>2</sup> Pakistan	45 (4.7)	311 (15.4)	55 (4.7)	273 (14.5)	38 (15.8)		
Bahrain	49 (1.2)	510 (3.8)	51 (1.2)	476 (5.1)	34 (6.1)		
Oman	50 (0.7)	447 (3.8)	50 (0.7)	423 (5.0)	24 (3.6)		
<sup>2</sup> Philippines	48 (0.7)	261 (7.8)	52 (0.7)	238 (7.8)	24 (4.9)		
<sup>3</sup> South Africa (5)	50 (0.6)	335 (5.4)	50 (0.6)	314 (5.2)	21 (3.9)		
North Macedonia	48 (0.6)	433 (6.5)	52 (0.6)	419 (6.7)	14 (4.3)		
<sup>2</sup> Kosovo	49 (1.0)	420 (4.2)	51 (1.0)	407 (4.0)	13 (3.6)		
Qatar	50 (1.5)	456 (6.0)	50 (1.5)	443 (3.7)	13 (6.1)		
Armenia	48 (0.8)	471 (3.5)	52 (0.8)	462 (4.0)	9 (3.1)		
<sup>3</sup> Morocco	49 (0.7)	379 (6.4)	51 (0.7)	370 (5.8)	9 (3.7)		
Albania	49 (0.9)	494 (3.9)	51 (0.9)	485 (3.9)	8 (3.4)		
Bulgaria	48 (0.9)	525 (5.3)	52 (0.9)	518 (5.4)	7 (4.3)		
<sup>2</sup> Serbia	50 (0.9)	521 (3.5)	50 (0.9)	513 (4.3)	7 (3.5)		
Bosnia and Herzegovina	49 (0.7)	462 (3.1)	51 (0.7)	455 (3.5)	7 (2.9)		
<sup>2</sup> Kazakhstan	49 (0.7)	497 (3.6)	51 (0.7)	491 (3.1)	6 (2.8)		
Montenegro	47 (0.6)	457 (2.9)	53 (0.6)	451 (2.8)	6 (2.8)		
Japan	48 (0.5)	565 (2.0)	52 (0.5)	559 (2.1)	6 (2.0)		
Finland	49 (0.9)	557 (3.5)	51 (0.9)	552 (2.4)	5 (3.1)		
<sup>2</sup> Latvia	50 (0.9)	544 (2.6)	50 (0.9)	540 (3.0)	5 (2.9)		
<sup>2</sup> New Zealand	48 (1.3)	505 (3.2)	52 (1.3)	500 (2.8)	5 (3.9)		
<sup>2</sup> Lithuania	49 (0.9)	540 (2.8)	51 (0.9)	536 (3.3)	4 (3.4)		
United Arab Emirates	50 (1.1)	475 (3.1)	50 (1.1)	471 (2.6)	4 (4.0)		
Azerbaijan	47 (0.9)	429 (3.9)	53 (0.9)	425 (3.5)	4 (3.2)		
<sup>1</sup> Norway (5)	48 (0.9)	541 (2.4)	52 (0.9)	538 (3.1)	3 (3.5)		
Poland	49 (0.8)	532 (2.8)	51 (0.8)	529 (3.2)	3 (3.0)		
Sweden	50 (1.1)	538 (3.6)	50 (1.1)	536 (3.8)	2 (3.3)		
France	49 (1.0)	489 (3.2)	51 (1.0)	487 (3.4)	2 (2.8)		
<sup>1</sup> Northern Ireland	50 (1.0)	519 (2.9)	50 (1.0)	518 (2.8)	1 (3.4)		
<sup>1</sup> Denmark	50 (0.8)	523 (2.7)	50 (0.8)	522 (2.8)	1 (2.8)		
Australia	49 (0.8)	533 (2.9)	51 (0.8)	532 (2.7)	1 (2.9)		
<sup>3</sup> Netherlands	49 (1.0)	519 (3.1)	51 (1.0)	518 (3.3)	0 (2.8)		
Croatia	50 (1.2)	524 (2.6)	50 (1.2)	524 (2.7)	0 (3.1)		
<sup>1</sup> Hong Kong SAR	46 (1.3)	531 (3.1)	54 (1.3)	531 (4.3)	0 (3.6)		
<sup>2</sup> England	50 (1.0)	537 (3.6)	50 (1.0)	537 (2.7)	0 (3.5)		
<sup>2</sup> Russian Federation	51 (1.1)	567 (3.5)	49 (1.1)	568 (3.3)	1 (3.0)		
Spain	47 (0.8)	511 (2.4)	53 (0.8)	512 (2.5)	1 (2.9)		
Iran, Islamic Rep. of	49 (2.1)	440 (6.6)	51 (2.1)	442 (5.4)	2 (8.7)		
Chinese Taipei	48 (0.6)	557 (2.0)	52 (0.6)	559 (2.2)	2 (2.3)		
<sup>1</sup> Belgium (Flemish)	51 (0.8)	499 (2.3)	49 (0.8)	503 (2.8)	4 (2.9)		
Cyprus	52 (0.7)	509 (2.8)	48 (0.7)	514 (4.1)	4 (3.3)		
Ireland	50 (1.1)	526 (3.8)	50 (1.1)	530 (3.4)	4 (3.5)		
Germany	50 (0.8)	516 (2.8)	50 (0.8)	520 (2.4)	4 (2.8)		
Malta	49 (0.7)	493 (2.1)	51 (0.7)	498 (2.4)	5 (3.7)		
<sup>1</sup> Georgia	49 (0.9)	452 (4.7)	51 (0.9)	457 (4.2)	5 (4.1)		
<sup>1</sup> Canada	49 (0.8)	520 (2.1)	51 (0.8)	526 (2.2)	5 (2.1)		
<sup>2</sup> Turkey (5)	52 (1.4)	524 (4.4)	48 (1.4)	529 (5.2)	5 (4.6)		
<sup>2</sup> Slovak Republic	49 (1.0)	518 (3.8)	51 (1.0)	523 (4.4)	5 (3.8)		
<sup>2</sup> United States	49 (0.8)	536 (3.0)	51 (0.8)	541 (3.2)	5 (2.7)		
<sup>2</sup> Portugal	48 (0.9)	501 (3.1)	52 (0.9)	506 (2.7)	6 (2.9)		
Austria	49 (1.0)	519 (3.1)	51 (1.0)	525 (3.0)	6 (3.3)		
Chile	50 (1.3)	466 (3.1)	50 (1.3)	472 (3.3)	6 (3.7)		
Hungary	48 (1.0)	526 (3.2)	52 (1.0)	533 (3.1)	6 (3.3)		
Italy	50 (0.8)	506 (3.3)	50 (0.8)	514 (3.3)	8 (2.8)		
<sup>3</sup> Singapore	49 (0.5)	591 (3.6)	51 (0.5)	598 (3.8)	8 (2.8)		
Czech Republic	49 (0.9)	529 (3.0)	51 (0.9)	538 (3.0)	8 (3.1)		
Korea, Rep. of	47 (0.7)	583 (2.4)	53 (0.7)	592 (2.5)	9 (2.5)		
International Average	49 (0.2)	493 (0.6)	51 (0.2)	489 (0.6)			

# TIMSS 2019

## Gender & Science Achievement (Primary 4)

■ Difference statistically significant  
■ Difference not statistically significant

# Gender and Achievement (P4)



**TIMSS 2019**  
**No significant  
difference**



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Country	Girls		Boys		Difference (Absolute Value)	Gender Difference	
	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score		Girls Scored Higher	Boys Scored Higher
Oman	48 (1.1)	485 (3.1)	52 (1.1)	431 (4.5)	54 (5.1)		
Jordan	48 (3.4)	480 (4.0)	52 (3.4)	427 (6.6)	53 (7.6)		
Bahrain	49 (0.9)	512 (2.6)	51 (0.9)	461 (2.8)	51 (3.7)		
<sup>2</sup> Saudi Arabia	49 (0.9)	455 (3.3)	51 (0.9)	408 (3.9)	47 (5.0)		
Kuwait	53 (2.2)	461 (5.7)	47 (2.2)	426 (9.4)	35 (10.3)		
Qatar	50 (2.4)	488 (5.2)	50 (2.4)	461 (6.0)	28 (7.4)		
<sup>2</sup> Egypt	55 (2.0)	402 (6.1)	45 (2.0)	374 (8.2)	27 (9.2)		
United Arab Emirates	48 (1.8)	486 (3.9)	52 (1.8)	461 (4.0)	25 (6.5)		
Finland	48 (0.8)	552 (3.1)	52 (0.8)	533 (3.9)	19 (3.5)		
Iran, Islamic Rep. of	47 (1.3)	459 (4.6)	53 (1.3)	441 (5.4)	17 (7.2)		
Cyprus	49 (0.6)	491 (2.4)	51 (0.6)	476 (2.5)	15 (3.1)		
<sup>ψ</sup> South Africa (9)	52 (0.6)	376 (3.2)	48 (0.6)	364 (3.6)	12 (2.8)		
<sup>2</sup> Sweden	49 (0.9)	527 (3.7)	51 (0.9)	516 (3.8)	11 (4.0)		
Romania	51 (0.9)	475 (4.3)	49 (0.9)	465 (4.9)	10 (3.9)		
Turkey	50 (1.3)	520 (3.8)	50 (1.3)	510 (5.1)	10 (5.1)		
<sup>2</sup> Kazakhstan	49 (1.1)	483 (3.4)	51 (1.1)	474 (3.6)	9 (3.4)		
Malaysia	51 (1.1)	463 (3.5)	49 (1.1)	458 (4.3)	5 (3.7)		
Ireland	49 (1.1)	526 (3.0)	51 (1.1)	521 (3.9)	5 (3.8)		
Lebanon	49 (1.4)	379 (5.3)	51 (1.4)	374 (5.2)	5 (5.0)		
<sup>†</sup> United States	49 (0.9)	525 (3.9)	51 (0.9)	520 (6.1)	5 (4.3)		
England	53 (1.9)	518 (5.5)	47 (1.9)	515 (6.6)	3 (7.2)		
Lithuania	50 (1.0)	535 (3.0)	50 (1.0)	533 (3.6)	2 (2.9)		
<sup>†</sup> Hong Kong SAR	46 (2.1)	505 (5.9)	54 (2.1)	503 (6.3)	2 (6.5)		
Morocco	50 (0.7)	395 (2.9)	50 (0.7)	393 (2.9)	2 (2.4)		
<sup>†</sup> Georgia	48 (1.2)	447 (4.4)	52 (1.2)	446 (4.5)	1 (4.3)		
Australia	49 (1.5)	529 (3.1)	51 (1.5)	528 (4.6)	0 (4.7)		
<sup>†</sup> Norway (9)	49 (0.7)	495 (3.5)	51 (0.7)	496 (3.8)	1 (3.9)		
<sup>†</sup> New Zealand	48 (2.1)	497 (3.6)	52 (2.1)	500 (4.9)	3 (5.0)		
<sup>3</sup> Israel	52 (1.7)	512 (4.5)	48 (1.7)	515 (5.0)	3 (4.6)		
France	49 (0.8)	487 (2.6)	51 (0.8)	490 (3.6)	4 (3.4)		
Chinese Taipei	50 (0.9)	572 (2.4)	50 (0.9)	576 (2.5)	4 (2.9)		
Portugal	50 (1.1)	516 (3.2)	50 (1.1)	522 (3.4)	6 (3.1)		
<sup>2</sup> Singapore	49 (0.7)	604 (4.5)	51 (0.7)	611 (4.5)	7 (4.4)		
<sup>2</sup> Russian Federation	48 (1.0)	539 (4.5)	52 (1.0)	546 (4.6)	7 (3.5)		
Italy	50 (1.0)	497 (2.8)	50 (1.0)	504 (3.0)	7 (2.7)		
Japan	52 (1.0)	565 (2.4)	48 (1.0)	575 (2.5)	10 (2.5)		
Korea, Rep. of	48 (1.4)	555 (2.9)	52 (1.4)	566 (2.6)	10 (3.5)		
Chile	49 (1.6)	457 (3.6)	51 (1.6)	468 (3.9)	11 (4.7)		
Hungary	50 (0.9)	520 (2.9)	50 (0.9)	540 (3.2)	20 (3.1)		
International Average	50 (0.2)	495 (0.6)	50 (0.2)	485 (0.8)			

## TIMSS 2019 Gender & Science Achievement (Secondary 2)

■ Difference statistically significant  
■ Difference not statistically significant

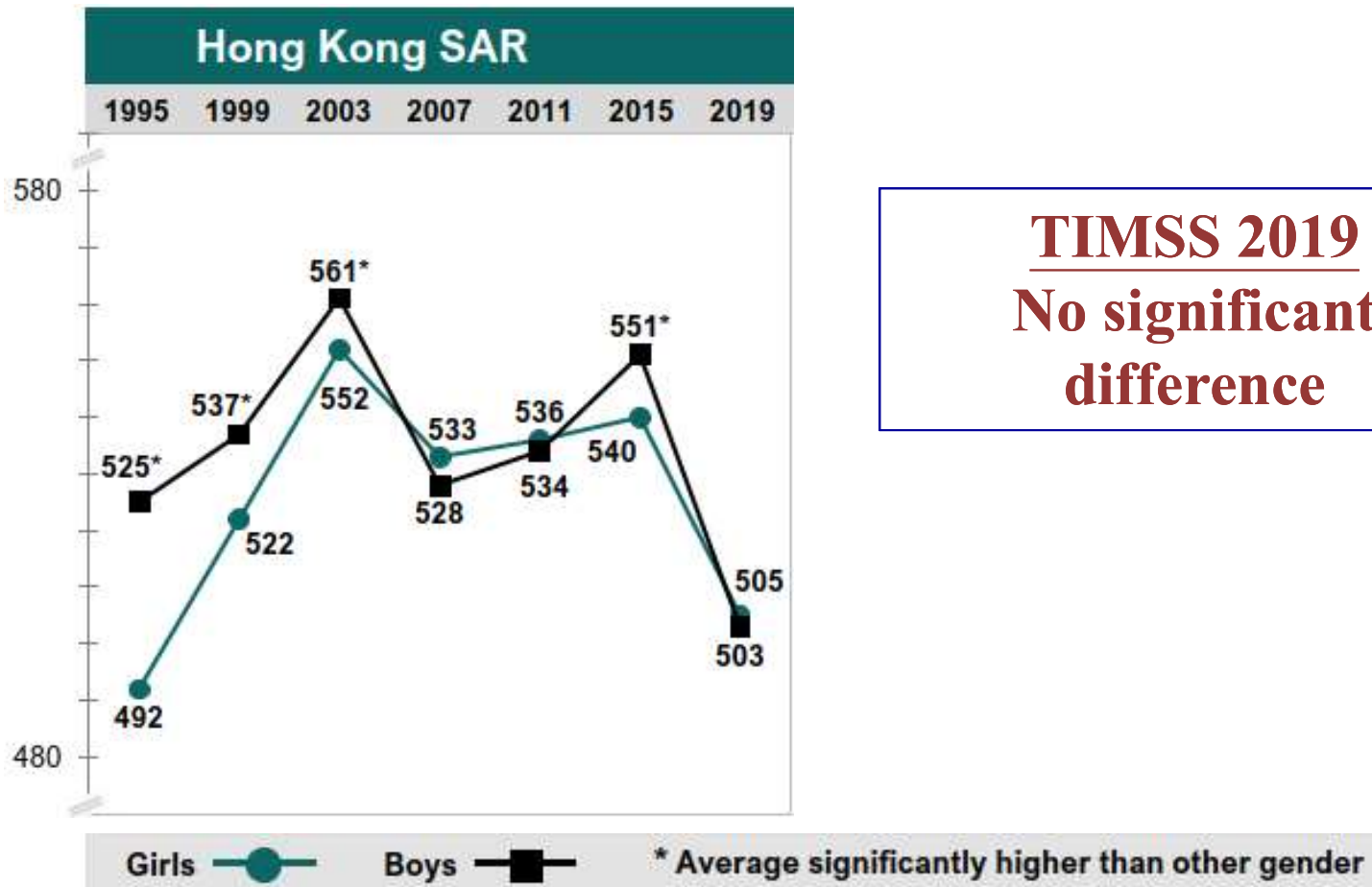


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# Gender and Achievement (S2)



**TIMSS 2019**  
**No significant  
difference**





# CONTENT AND COGNITIVE DOMAINS OF SCIENCE



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# Content and Cognitive Domains

<b>Primary 4</b>	Life Science	Physical Science	Earth Science
HKSAR	523	529	549
	Knowing	Applying	Reasoning
HKSAR	537	526	531

	Biology	Chemistry	Physics	Earth Science
<b>Secondary 2</b>				
HKSAR	501	485	510	512
	Knowing	Applying	Reasoning	
HKSAR	501	501	504	



# Content and Cognitive Domains by Gender (Primary 4)

Primary 4	Life Science			Physical Science			Earth Science	
	Girls	Boys		Girls	Boys		Girls	Boys
HKSAR	529*	518		525	532		544	554*
International	510*	503		504	506*		499	503*

Primary 4	Knowing			Applying			Reasoning	
	Girls	Boys		Girls	Boys		Girls	Boys
HKSAR	531	542*		528	525		534	528
International	504	507*		506*	503		509*	503

\*Achievement significantly higher



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# Content and Cognitive Domains by Gender (Secondary 2)

	Biology		Chemistry		Physics		Earth Science	
Secondary 2	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
HKSAR	502	499	492	479	511	509	506	516
International	499*	487	499*	480	491	490	486	489*

	Knowing		Applying		Reasoning	
Secondary 2	Girls	Boys	Girls	Boys	Girls	Boys
HKSAR	493	508*	505	499	510	498
International	495*	490	496*	487	496*	486

\*Achievement significantly higher



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# Science Labs and Science Experiments



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# Science Lab in Schools

Having a Science Lab in Schools		
	Percentage of Students	
	Primary 4	Secondary 2
Hong Kong	42% (543)	99% (523)
Chinese Taipei	93% (557)	99% (575)
Japan	100% (562)	99% (570)
Korea	99% (588)	100% (561)
Singapore	98% (595)	100% (608)
International	36% (496)	85% (486)



# Conducting Science Experiments

Frequency on Conducting Experiments in Science Lessons  
(Primary 4)

	At Least Once a Week	Once or Twice a Month	A Few Times a Year	Never
<b>Primary 4</b>				
Hong Kong	<b>13% (512)</b>	<b>28% (535)</b>	<b>36% (546)</b>	<b>22% (515)</b>
Chinese Taipei	<b>58% (562)</b>	<b>31% (558)</b>	<b>3% (546)</b>	<b>1% (529)</b>
Japan	<b>64% (561)</b>	<b>32% (572)</b>	<b>3% (505)</b>	<b>1% (~)</b>
Korea	<b>72% (587)</b>	<b>25% (591)</b>	<b>3% (585)</b>	<b>1% (~)</b>
Singapore	<b>39% (588)</b>	<b>40% (605)</b>	<b>17% (595)</b>	<b>4% (558)</b>
International	<b>31% (475)</b>	<b>26% (499)</b>	<b>24% (503)</b>	<b>18% (478)</b>

# Conducting Science Experiments

Frequency on Conducting Experiments in Science Lessons  
(Secondary 2)

	At Least Once a Week	Once or Twice a Month	A Few Times a Year	Never
<b>Secondary 2</b>				
Hong Kong	<b>57% (510)</b>	<b>37% (504)</b>	<b>4% (460)</b>	<b>2% (~)</b>
Chinese Taipei	<b>13% (558)</b>	<b>53% (579)</b>	<b>25% (586)</b>	<b>9% (542)</b>
Japan	<b>35% (575)</b>	<b>60% (569)</b>	<b>5% (546)</b>	<b>0% (~)</b>
Korea	<b>6% (547)</b>	<b>49% (559)</b>	<b>39% (571)</b>	<b>6% (522)</b>
Singapore	<b>12% (612)</b>	<b>42% (617)</b>	<b>43% (602)</b>	<b>3% (541)</b>
International	<b>28% (478)</b>	<b>37% (502)</b>	<b>24% (501)</b>	<b>11% (451)</b>



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# ATTITUDINAL RESULTS



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# Attitudinal Results (Primary 4)

Primary 4	Students Very Much Like Learning Science	Students Somewhat Like Learning Science	Students Do Not Like Learning Science
HKSAR % (Scale Avg.)	49% (547)	37% (519)	15% (509)
Int'l % (Scale Avg.)	52% (506)	36% (478)	12% (467)

Primary 4	Students Very Confident in Science	Students Somewhat Confident in Science	Students Not Confident in Science
HKSAR % (Scale Avg.)	23% (562)	49% (532)	29% (506)
Int'l % (Scale Avg.)	38% (520)	43% (486)	19% (453)





Country	Very Much Like Learning Science		Somewhat Like Learning Science		Do Not Like Learning Science	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	83 (1.1)	498 (3.3)	15 (1.0)	457 (7.8)	1 (0.2)	~ ~
Portugal	74 (1.0)	513 (2.6)	21 (0.9)	480 (3.7)	4 (0.4)	477 (6.9)
Kosovo	72 (1.5)	429 (3.9)	25 (1.3)	383 (5.0)	3 (0.4)	364 (14.2)
Iran, Islamic Rep. of	70 (1.1)	459 (3.4)	24 (1.0)	402 (6.6)	5 (0.5)	402 (9.1)
Bulgaria	69 (1.6)	533 (4.5)	25 (1.2)	504 (6.8)	6 (0.9)	486 (18.3)
Morocco	69 (1.3)	401 (5.8)	26 (1.1)	322 (7.6)	5 (0.4)	294 (12.9)
Turkey (5)	69 (1.6)	544 (3.4)	25 (1.2)	493 (6.5)	6 (0.7)	473 (10.0)
Bahrain	68 (1.2)	514 (2.9)	24 (0.9)	454 (4.9)	7 (0.6)	445 (7.4)
Oman	68 (1.3)	464 (4.7)	27 (1.2)	387 (5.4)	5 (0.5)	360 (9.2)
Armenia	66 (1.3)	483 (3.2)	27 (1.2)	450 (5.3)	8 (0.6)	439 (6.7)
United Arab Emirates	64 (0.6)	500 (2.2)	28 (0.5)	435 (2.6)	8 (0.3)	410 (4.4)
Georgia	62 (1.6)	459 (4.1)	32 (1.4)	442 (6.0)	6 (0.6)	459 (9.1)
Saudi Arabia	61 (1.2)	438 (3.5)	29 (1.0)	356 (5.7)	9 (0.6)	369 (8.2)
Montenegro	61 (1.2)	467 (2.6)	32 (0.9)	440 (3.3)	7 (0.5)	434 (7.8)
Azerbaijan	61 (1.4)	448 (2.8)	33 (1.3)	414 (4.2)	6 (0.5)	409 (8.6)
Kazakhstan	59 (1.3)	503 (3.8)	36 (1.2)	484 (3.4)	5 (0.5)	488 (7.4)
North Macedonia	59 (1.7)	455 (4.9)	36 (1.7)	397 (8.2)	6 (0.7)	383 (12.5)
Kuwait	58 (1.4)	430 (6.4)	33 (1.1)	360 (7.7)	9 (0.7)	333 (10.0)
Malta	58 (0.8)	509 (1.6)	29 (0.6)	484 (3.0)	13 (0.6)	466 (4.0)
Qatar	56 (1.6)	485 (3.5)	34 (1.3)	415 (5.4)	10 (0.6)	396 (7.4)
Ireland	56 (1.3)	537 (3.3)	33 (1.0)	523 (4.0)	12 (0.7)	507 (5.2)
Northern Ireland	56 (1.1)	530 (2.4)	33 (1.0)	510 (3.4)	11 (0.7)	487 (4.5)
Italy	55 (1.1)	514 (3.5)	35 (0.8)	509 (3.4)	10 (0.7)	495 (4.8)
Lithuania	53 (1.7)	541 (3.0)	38 (1.3)	538 (3.5)	9 (0.8)	524 (5.0)
Japan	52 (1.2)	569 (2.1)	39 (1.0)	554 (2.3)	9 (0.6)	551 (4.0)
United States	52 (1.0)	551 (2.6)	34 (0.8)	533 (3.6)	14 (0.7)	523 (4.8)
New Zealand	52 (1.1)	513 (3.0)	34 (0.9)	500 (2.8)	14 (0.8)	479 (3.5)
Chinese Taipei	51 (1.5)	566 (2.0)	37 (1.1)	554 (2.6)	12 (0.9)	537 (4.3)
Australia	50 (1.4)	539 (3.1)	34 (0.9)	533 (2.9)	16 (1.0)	515 (4.6)
Singapore	49 (1.0)	605 (3.6)	39 (0.7)	588 (3.9)	12 (0.5)	574 (4.7)
Bosnia and Herzegovina	49 (1.1)	467 (3.5)	35 (0.8)	453 (3.6)	16 (0.8)	454 (4.6)
Hong Kong SAR	49 (1.5)	547 (3.5)	37 (1.2)	519 (4.8)	15 (1.0)	509 (6.7)
Austria	49 (1.1)	533 (2.8)	38 (0.9)	517 (3.5)	13 (0.7)	501 (5.3)
Canada	49 (1.0)	528 (2.2)	36 (0.8)	524 (2.2)	15 (0.6)	511 (2.8)
Spain	48 (1.4)	520 (2.7)	40 (1.0)	506 (2.5)	13 (0.8)	503 (6.7)
Germany	47 (1.4)	535 (2.6)	38 (1.0)	517 (3.7)	15 (0.9)	498 (4.4)
Norway (5)	47 (1.4)	546 (2.6)	41 (1.0)	540 (2.7)	12 (0.8)	524 (5.2)
England	46 (1.6)	542 (3.7)	37 (1.2)	540 (3.6)	16 (1.1)	528 (4.8)
Hungary	46 (1.3)	538 (2.5)	38 (1.0)	523 (3.6)	15 (1.0)	520 (5.0)
Cyprus	46 (1.7)	525 (3.5)	32 (1.1)	504 (3.2)	22 (1.4)	496 (4.4)
France	45 (1.2)	496 (3.8)	38 (0.9)	487 (3.4)	17 (1.0)	467 (5.1)
Russian Federation	44 (1.3)	570 (3.8)	42 (0.9)	565 (3.1)	14 (0.9)	567 (4.2)
Chile	44 (1.1)	486 (3.2)	44 (0.9)	462 (3.2)	12 (0.8)	450 (5.9)
South Africa (5)	43 (1.2)	390 (5.2)	45 (0.9)	284 (5.1)	11 (0.5)	264 (6.3)
Pakistan	42 (3.2)	323 (15.0)	49 (2.5)	269 (15.2)	9 (1.5)	258 (16.1)
Netherlands	41 (1.3)	530 (3.1)	40 (0.9)	516 (3.6)	19 (0.9)	504 (4.6)
Belgium (Flemish)	41 (1.4)	507 (2.9)	41 (0.9)	502 (2.8)	19 (1.0)	486 (3.0)
Latvia	39 (1.3)	546 (3.0)	47 (1.2)	542 (2.7)	14 (0.8)	534 (4.5)
Sweden	39 (1.5)	538 (4.5)	41 (1.2)	543 (3.4)	20 (1.3)	527 (4.5)
Serbia	39 (1.5)	522 (4.2)	46 (1.1)	512 (4.3)	15 (1.1)	527 (4.3)
Slovak Republic	38 (1.6)	525 (4.1)	43 (0.9)	522 (4.7)	19 (1.1)	512 (5.5)
Poland	38 (1.3)	541 (3.3)	44 (1.0)	527 (2.8)	18 (0.9)	528 (3.7)
Korea, Rep. of	37 (1.3)	602 (2.7)	47 (0.9)	581 (2.8)	16 (1.0)	572 (3.6)
Denmark	35 (1.4)	534 (3.1)	43 (1.1)	521 (3.0)	22 (1.3)	509 (3.3)
Croatia	34 (1.3)	531 (3.2)	50 (1.0)	521 (2.4)	16 (0.9)	518 (4.1)
Czech Republic	34 (1.4)	541 (4.0)	44 (1.0)	534 (2.9)	22 (1.1)	527 (2.9)
Philippines	32 (1.8)	334 (7.5)	53 (1.4)	221 (7.1)	15 (0.9)	180 (7.3)
Finland	26 (1.0)	554 (3.2)	45 (0.9)	556 (3.1)	29 (1.1)	554 (3.1)
International Average	52 (0.2)	506 (0.5)	36 (0.1)	478 (0.6)	12 (0.1)	467 (0.9)

## Primary 4

## Students Like Learning Science Scale

Country	Very Confident in Science		Somewhat Confident in Science		Not Confident in Science	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	60 (1.6)	509 (3.7)	30 (1.4)	474 (5.0)	9 (0.7)	428 (9.0)
Bulgaria	58 (1.8)	555 (3.9)	30 (1.1)	499 (6.5)	12 (1.1)	443 (8.3)
Iran, Islamic Rep. of	57 (1.4)	472 (4.2)	30 (1.0)	416 (5.5)	13 (1.0)	374 (7.5)
Bahrain	57 (1.3)	521 (3.2)	30 (0.9)	473 (4.0)	13 (0.7)	430 (6.3)
Montenegro	53 (1.1)	482 (2.8)	30 (0.8)	443 (3.2)	17 (0.7)	403 (4.5)
Saudi Arabia	51 (1.2)	444 (3.7)	32 (1.0)	386 (5.6)	16 (0.9)	341 (7.7)
Turkey (5)	50 (1.4)	556 (3.8)	36 (1.0)	510 (4.6)	14 (0.9)	470 (7.0)
Oman	50 (1.4)	480 (5.2)	35 (1.1)	412 (4.4)	15 (0.8)	363 (6.3)
Austria	49 (1.1)	544 (2.7)	37 (1.0)	511 (3.0)	13 (0.7)	474 (4.8)
North Macedonia	49 (2.0)	471 (5.1)	35 (1.7)	403 (7.1)	16 (0.9)	365 (8.2)
Azerbaijan	48 (1.4)	457 (3.2)	36 (1.2)	422 (3.8)	16 (0.8)	395 (6.0)
Armenia	47 (1.3)	490 (3.3)	36 (1.1)	462 (4.2)	17 (0.8)	436 (5.8)
Kosovo	47 (1.2)	444 (3.9)	37 (1.0)	404 (4.2)	16 (0.9)	361 (7.0)
United Arab Emirates	46 (0.6)	505 (2.5)	36 (0.5)	465 (2.5)	17 (0.4)	417 (3.2)
Kuwait	46 (1.4)	435 (6.7)	36 (0.9)	384 (6.7)	18 (0.9)	338 (9.0)
Bosnia and Herzegovina	46 (0.9)	482 (3.3)	36 (0.7)	451 (3.5)	19 (0.7)	425 (4.3)
Morocco	46 (1.2)	416 (4.9)	39 (0.8)	355 (7.9)	15 (0.8)	305 (9.0)
Hungary	45 (1.2)	553 (2.6)	39 (0.8)	520 (3.2)	16 (0.8)	484 (5.1)
Georgia	44 (1.4)	472 (4.3)	38 (1.1)	448 (5.3)	19 (1.1)	423 (6.1)
Kazakhstan	43 (1.4)	511 (3.9)	46 (1.1)	485 (3.4)	11 (0.7)	479 (5.4)
Portugal	43 (1.2)	522 (2.8)	44 (1.0)	499 (2.8)	13 (0.6)	463 (4.0)
Qatar	42 (1.4)	488 (3.9)	38 (1.0)	441 (6.2)	20 (1.0)	395 (5.6)
Malta	42 (0.9)	521 (2.1)	38 (0.8)	488 (2.4)	20 (0.7)	457 (3.0)
Norway (5)	41 (1.1)	557 (2.4)	46 (1.1)	535 (3.0)	12 (0.8)	511 (5.0)
Germany	40 (1.1)	551 (2.8)	44 (0.8)	517 (3.1)	17 (0.9)	471 (4.6)
Cyprus	39 (1.5)	535 (3.1)	37 (1.1)	504 (2.9)	23 (1.1)	485 (4.6)
Italy	39 (1.0)	522 (3.8)	46 (0.9)	509 (3.1)	15 (0.9)	483 (4.5)
Croatia	39 (1.2)	541 (2.5)	49 (1.2)	518 (2.4)	12 (0.9)	496 (4.9)
United States	38 (0.9)	565 (2.7)	42 (0.7)	540 (2.9)	20 (0.7)	500 (4.4)
Belgium (Flemish)	37 (1.1)	521 (2.5)	45 (0.9)	498 (2.5)	18 (0.8)	467 (3.5)
Serbia	37 (1.4)	540 (4.0)	47 (1.2)	515 (4.1)	17 (1.0)	476 (6.7)
Sweden	36 (1.5)	552 (4.0)	49 (1.1)	538 (3.2)	14 (0.9)	504 (6.5)
Spain	35 (1.1)	535 (2.7)	41 (1.0)	508 (2.2)	23 (1.0)	486 (3.4)
Canada	35 (0.7)	540 (2.4)	46 (0.7)	523 (2.1)	19 (0.7)	498 (2.5)
Ireland	35 (0.9)	542 (4.0)	48 (0.9)	529 (3.9)	18 (0.9)	502 (4.4)
Slovak Republic	33 (1.2)	546 (3.4)	46 (1.0)	519 (4.1)	21 (0.9)	487 (6.9)
Netherlands	32 (1.1)	541 (3.7)	48 (1.0)	519 (3.1)	19 (1.0)	486 (3.8)
Australia	32 (1.1)	553 (3.0)	47 (0.9)	532 (2.8)	21 (0.9)	508 (4.1)
Poland	32 (1.2)	553 (3.3)	49 (0.9)	531 (2.8)	19 (0.8)	503 (3.6)
Chinese Taipei	31 (1.0)	583 (2.2)	51 (0.9)	556 (2.1)	18 (1.0)	522 (3.4)
Latvia	31 (1.1)	559 (2.8)	51 (1.1)	540 (2.8)	18 (1.0)	520 (3.7)
Russian Federation	29 (1.0)	583 (3.1)	46 (1.1)	567 (3.5)	24 (0.9)	550 (3.5)
Lithuania	29 (1.2)	564 (3.0)	52 (1.0)	533 (3.1)	19 (1.0)	516 (4.3)
Northern Ireland	29 (1.0)	536 (3.1)	49 (0.9)	523 (2.9)	22 (0.8)	487 (4.1)
Denmark	29 (1.2)	545 (3.3)	50 (1.1)	522 (2.6)	21 (1.0)	493 (3.2)
England	28 (1.0)	559 (4.2)	47 (1.0)	538 (3.2)	25 (1.2)	516 (3.9)
Finland	27 (0.8)	573 (3.4)	57 (0.9)	555 (2.6)	16 (0.7)	525 (4.0)
France	27 (0.9)	517 (3.8)	48 (1.0)	492 (3.3)	25 (1.0)	451 (4.1)
Japan	27 (0.9)	582 (2.7)	59 (0.8)	558 (1.9)	14 (0.7)	540 (3.7)
Czech Republic	25 (1.0)	560 (3.9)	50 (1.0)	535 (3.3)	25 (1.2)	507 (2.9)
South Africa (5)	23 (0.8)	421 (6.3)	47 (0.7)	317 (5.4)	30 (0.7)	274 (5.2)
Singapore	23 (0.6)	626 (3.6)	44 (0.7)	599 (3.6)	33 (0.7)	567 (3.9)
Pakistan	23 (3.2)	333 (19.9)	49 (2.3)	289 (14.4)	28 (3.5)	262 (14.1)
Chile	23 (1.0)	508 (3.8)	48 (0.8)	473 (2.8)	30 (0.9)	439 (3.6)
Hong Kong SAR	23 (0.9)	562 (3.9)	49 (1.1)	532 (3.5)	29 (1.2)	506 (4.9)
New Zealand	21 (0.7)	529 (3.3)	53 (0.9)	508 (2.7)	26 (0.8)	476 (3.3)
Korea, Rep. of	17 (0.8)	620 (3.1)	59 (1.1)	587 (2.6)	23 (1.0)	564 (3.2)
Philippines	10 (0.9)	372 (10.6)	52 (0.9)	258 (7.2)	38 (1.2)	212 (7.4)
International Average	38 (0.2)	520 (0.6)	43 (0.1)	486 (0.6)	19 (0.1)	453 (0.7)

**Primary 4**

**Students Confident  
in Science Scale**



# Attitudinal Results (Secondary 2)

<b>Secondary 2</b>	<b>Students Very Much Like Learning Science</b>	<b>Students Somewhat Like Learning Science</b>	<b>Students Do Not Like Learning Science</b>
<b>HKSAR % (Scale Avg.)</b>	<b>23% (541)</b>	<b>55% (501)</b>	<b>22% (472)</b>
<b>Int'l % (Scale Avg.)</b>	<b>35% (524)</b>	<b>44% (484)</b>	<b>20% (460)</b>

<b>Secondary 2</b>	<b>Students Very Confident in Science</b>	<b>Students Somewhat confident in Science</b>	<b>Students Not Confident in Science</b>
<b>HKSAR % (Scale Avg.)</b>	<b>11% (566)</b>	<b>38% (527)</b>	<b>50% (472)</b>
<b>Int'l % (Scale Avg.)</b>	<b>23% (547)</b>	<b>39% (500)</b>	<b>38% (456)</b>

General/Integrated Science	Very Much Like Learning Science		Somewhat Like Learning Science		Do Not Like Learning Science	
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Jordan	56 (1.6)	479 (3.8)	36 (1.4)	426 (6.1)	8 (0.5)	424 (7.0)
Egypt	54 (1.6)	426 (5.0)	38 (1.3)	358 (6.5)	8 (0.7)	345 (8.6)
Turkey	54 (1.4)	536 (3.3)	37 (0.9)	494 (5.0)	10 (0.8)	481 (8.4)
Iran, Islamic Rep. of	53 (1.3)	469 (3.9)	37 (1.0)	428 (4.4)	11 (0.6)	429 (5.9)
Kuwait	46 (1.7)	468 (5.5)	39 (1.1)	435 (6.4)	15 (1.1)	414 (7.2)
Malaysia	46 (1.1)	484 (3.3)	46 (0.8)	450 (3.9)	8 (0.7)	388 (8.0)
Saudi Arabia	46 (1.3)	454 (3.1)	40 (0.8)	417 (3.3)	14 (0.9)	417 (4.1)
Oman	46 (1.0)	495 (3.0)	44 (0.8)	438 (3.7)	10 (0.6)	412 (7.0)
United Arab Emirates	44 (0.6)	523 (2.7)	41 (0.6)	445 (2.6)	15 (0.4)	412 (3.8)
Bahrain	44 (1.2)	516 (2.4)	40 (0.9)	474 (3.2)	16 (0.7)	448 (4.6)
South Africa (9)	42 (0.9)	398 (3.4)	45 (0.6)	352 (3.3)	13 (0.5)	353 (4.2)
Qatar	38 (1.4)	509 (5.0)	45 (1.2)	459 (4.8)	17 (0.9)	441 (5.7)
Singapore	37 (0.9)	635 (3.8)	49 (0.8)	601 (3.8)	14 (0.6)	558 (6.0)
United States	31 (0.9)	550 (5.0)	46 (0.7)	522 (4.9)	23 (0.7)	499 (5.7)
Italy	29 (1.2)	519 (3.4)	50 (1.0)	499 (2.8)	20 (0.9)	481 (3.8)
Ireland	27 (1.2)	558 (3.5)	42 (1.0)	532 (2.8)	30 (1.3)	493 (4.3)
Australia	27 (1.1)	569 (4.1)	45 (0.8)	526 (3.5)	28 (1.3)	499 (3.6)
Israel	27 (1.2)	547 (4.8)	42 (0.8)	512 (5.0)	31 (1.1)	496 (5.2)
Chile	26 (1.2)	482 (4.7)	53 (1.0)	460 (3.4)	22 (1.2)	450 (3.9)
New Zealand	25 (1.1)	532 (4.8)	49 (0.9)	499 (4.2)	25 (1.2)	471 (4.6)
Norway (9)	25 (1.1)	530 (4.5)	51 (1.0)	495 (3.3)	25 (1.0)	467 (4.3)
England	24 (1.3)	556 (5.9)	45 (1.1)	524 (5.0)	30 (1.3)	485 (5.7)
Hong Kong SAR	23 (1.0)	541 (6.1)	55 (1.1)	501 (6.1)	22 (1.1)	472 (7.5)
Chinese Taipei	20 (0.8)	616 (3.2)	51 (0.9)	576 (2.5)	30 (1.0)	544 (2.6)
Japan	16 (0.8)	605 (4.2)	49 (1.1)	577 (2.4)	35 (1.4)	544 (2.6)
Korea, Rep. of	12 (0.5)	625 (4.6)	41 (1.0)	577 (3.0)	47 (1.2)	531 (2.4)
International Average	35 (0.2)	524 (0.8)	44 (0.2)	484 (0.8)	20 (0.2)	460 (1.1)

## Secondary 2

## Students Like Learning Science Scale



General/Integrated Science	Very Confident in Science		Somewhat Confident in Science		Not Confident in Science	
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Iran, Islamic Rep. of	38 (1.1)	490 (3.9)	40 (0.9)	434 (4.3)	22 (0.9)	407 (4.0)
Turkey	38 (1.2)	569 (3.5)	37 (0.8)	502 (4.2)	25 (1.0)	455 (4.5)
Jordan	37 (1.4)	502 (3.6)	38 (0.6)	448 (4.5)	25 (1.3)	400 (5.8)
Bahrain	36 (1.3)	531 (2.4)	38 (0.7)	487 (3.8)	26 (1.0)	432 (4.1)
Egypt	35 (1.1)	445 (5.1)	38 (0.7)	384 (5.7)	27 (1.1)	343 (6.8)
Saudi Arabia	33 (1.0)	474 (3.4)	42 (0.8)	425 (3.1)	25 (1.0)	399 (3.7)
Israel	31 (1.2)	568 (4.4)	37 (0.9)	513 (4.3)	32 (1.2)	471 (5.0)
Kuwait	31 (1.3)	490 (5.1)	42 (0.7)	440 (5.6)	27 (1.2)	410 (7.6)
Oman	29 (1.0)	516 (4.1)	46 (0.8)	457 (3.5)	26 (0.7)	408 (4.3)
United Arab Emirates	29 (0.6)	541 (2.6)	41 (0.6)	476 (2.7)	30 (0.5)	413 (2.9)
Qatar	28 (1.3)	527 (4.7)	39 (1.1)	480 (4.6)	33 (1.2)	427 (5.2)
United States	26 (0.9)	570 (5.4)	41 (0.7)	528 (4.9)	33 (0.9)	487 (4.5)
Norway (9)	24 (0.9)	548 (4.1)	43 (0.8)	503 (3.0)	34 (1.1)	454 (4.2)
Italy	23 (1.0)	536 (3.6)	50 (1.1)	501 (2.5)	27 (1.1)	471 (3.6)
Ireland	19 (0.9)	581 (3.7)	36 (1.1)	543 (3.1)	45 (1.3)	492 (3.3)
South Africa (9)	18 (0.6)	425 (4.0)	45 (0.5)	370 (3.5)	37 (0.8)	349 (3.1)
Singapore	17 (0.6)	652 (3.9)	37 (0.8)	621 (4.2)	46 (1.0)	581 (4.1)
Australia	16 (0.7)	586 (4.2)	39 (0.8)	543 (3.3)	45 (1.1)	499 (3.6)
England	15 (1.0)	581 (6.9)	38 (1.2)	539 (4.6)	48 (1.7)	488 (5.5)
New Zealand	12 (0.7)	567 (5.5)	40 (1.0)	517 (4.5)	47 (1.2)	470 (4.0)
Chile	12 (0.8)	511 (5.4)	45 (1.1)	469 (3.2)	43 (1.4)	445 (3.2)
Hong Kong SAR	11 (0.6)	566 (6.2)	38 (1.1)	527 (5.8)	50 (1.2)	472 (6.3)
Chinese Taipei	10 (0.5)	645 (3.5)	27 (0.7)	609 (2.7)	63 (0.9)	548 (2.1)
Korea, Rep. of	9 (0.5)	639 (4.9)	25 (0.9)	602 (2.9)	65 (1.1)	533 (2.2)
Malaysia	8 (0.4)	523 (5.0)	47 (0.9)	469 (3.7)	45 (1.1)	441 (4.0)
Japan	6 (0.4)	636 (3.9)	28 (0.8)	601 (2.8)	66 (0.9)	550 (2.3)
International Average	23 (0.2)	547 (0.9)	39 (0.2)	500 (0.8)	38 (0.2)	456 (0.9)

## Secondary 2

### Students Confident in Science Scale





# Attitudinal Results (Secondary 2)

<b>Secondary 2</b>	<b>Students Strongly Value Science</b>	<b>Students Somewhat Value Science</b>	<b>Students Do Not Value Science</b>
<b>HKSAR % (Scale Avg.)</b>	<b>23% (526)</b>	<b>49% (509)</b>	<b>29% (478)</b>
<b>Int'l % (Scale Avg.)</b>	<b>36% (511)</b>	<b>42% (487)</b>	<b>22% (467)</b>



Country	Strongly Value Science		Somewhat Value Science		Do Not Value Science	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Egypt	67 (1.1)	412 (5.2)	26 (0.9)	362 (6.7)	7 (0.5)	344 (7.8)
Jordan	64 (1.2)	468 (4.4)	29 (0.9)	438 (4.8)	7 (0.5)	418 (8.6)
Oman	57 (0.9)	483 (3.0)	35 (0.8)	440 (3.7)	8 (0.6)	409 (7.9)
Iran, Islamic Rep. of	57 (1.2)	462 (4.3)	33 (1.0)	434 (3.8)	11 (0.6)	436 (7.3)
United Arab Emirates	55 (0.7)	501 (2.6)	34 (0.6)	453 (2.8)	11 (0.3)	417 (4.4)
Saudi Arabia	55 (1.3)	442 (3.3)	34 (0.9)	427 (3.4)	11 (0.7)	414 (4.5)
Kuwait	54 (1.2)	460 (5.5)	34 (1.1)	439 (5.9)	12 (0.7)	419 (7.3)
South Africa (9)	54 (0.7)	380 (3.5)	34 (0.5)	353 (3.1)	12 (0.4)	387 (4.4)
Bahrain	51 (0.9)	507 (1.8)	36 (0.7)	479 (3.5)	13 (0.6)	445 (5.9)
Morocco	49 (0.9)	409 (2.7)	39 (0.7)	383 (3.2)	12 (0.6)	386 (4.0)
Qatar	49 (1.0)	495 (5.4)	37 (0.8)	467 (5.0)	15 (0.9)	436 (5.8)
Lebanon	49 (1.1)	404 (5.3)	39 (0.9)	360 (5.0)	12 (0.6)	350 (9.2)
Turkey	46 (1.2)	529 (4.1)	38 (0.8)	506 (4.4)	15 (0.9)	499 (5.8)
Malaysia	45 (1.2)	492 (3.0)	46 (0.9)	445 (4.2)	9 (0.7)	384 (6.9)
Georgia	43 (1.2)	457 (4.2)	43 (1.1)	445 (4.3)	14 (0.9)	430 (5.6)
Singapore	42 (1.0)	632 (3.5)	48 (0.8)	598 (4.1)	11 (0.6)	557 (6.3)
United States	36 (0.9)	540 (5.9)	43 (0.7)	526 (4.7)	21 (0.6)	503 (4.3)
Israel	36 (1.3)	531 (5.2)	36 (0.9)	518 (4.7)	29 (1.2)	498 (5.6)
England	33 (1.1)	540 (5.3)	45 (1.1)	523 (5.6)	22 (1.0)	491 (5.5)
Cyprus	33 (1.0)	510 (2.9)	43 (1.2)	485 (2.5)	24 (0.9)	458 (3.4)
Russian Federation	32 (1.0)	548 (4.8)	50 (0.8)	540 (4.7)	18 (0.9)	545 (4.5)
Romania	31 (1.3)	487 (5.3)	41 (1.1)	468 (4.6)	28 (1.2)	462 (4.5)
Kazakhstan	30 (1.0)	487 (4.0)	51 (0.9)	477 (3.4)	19 (0.8)	471 (5.1)
Australia	28 (0.9)	561 (4.1)	42 (0.6)	530 (3.5)	29 (0.8)	501 (3.1)
Portugal	27 (1.1)	542 (4.2)	44 (1.1)	517 (3.4)	28 (1.1)	503 (3.0)
Lithuania	27 (1.0)	549 (4.3)	51 (1.1)	531 (3.4)	21 (0.8)	526 (4.0)
New Zealand	26 (0.9)	520 (5.0)	47 (0.8)	503 (3.9)	28 (1.0)	479 (4.2)
Chile	25 (0.9)	471 (3.8)	48 (0.8)	462 (3.4)	27 (1.0)	459 (3.9)
Ireland	25 (1.0)	555 (3.9)	42 (1.1)	534 (2.8)	33 (1.1)	500 (3.7)
Hong Kong SAR	23 (0.9)	526 (7.6)	49 (1.1)	509 (5.5)	29 (1.1)	478 (6.4)
Norway (9)	21 (0.9)	516 (5.4)	48 (0.9)	501 (3.1)	31 (1.1)	478 (4.4)
Hungary	21 (1.1)	553 (4.8)	47 (0.9)	527 (3.5)	33 (1.1)	519 (3.0)
Sweden	20 (0.9)	541 (5.7)	48 (1.1)	527 (3.9)	32 (1.0)	510 (3.6)
Italy	19 (0.8)	515 (4.0)	45 (1.0)	506 (2.9)	35 (1.1)	487 (2.9)
France	19 (0.8)	516 (4.5)	47 (0.9)	496 (3.2)	34 (1.1)	465 (2.7)
Finland	18 (0.9)	586 (4.3)	48 (0.9)	550 (3.2)	35 (1.1)	514 (3.0)
Korea, Rep. of	16 (0.7)	611 (4.2)	50 (0.9)	573 (2.6)	34 (1.1)	519 (2.7)
Chinese Taipei	14 (0.7)	609 (4.4)	41 (0.8)	589 (2.5)	45 (1.0)	551 (2.4)
Japan	11 (0.6)	598 (4.9)	48 (1.0)	581 (2.5)	41 (1.1)	550 (2.5)
International Average	36 (0.2)	511 (0.7)	42 (0.1)	487 (0.6)	22 (0.1)	467 (0.8)

## Secondary 2

## Students Value Science Scale



# Trends in Attitudinal Results

Students Like Learning Science– Primary 4 / Secondary 2				
	Very Much Like Learning Science			
	Percentage of Primary 4 Students		Percentage of Secondary 2 Students	
	Hong Kong	International	Hong Kong	International
2019	49 (1.5)	52 (0.2)	23 (1.0)	35 (0.2)
2015	57 <sup>^</sup> (1.0)	56 <sup>^</sup> (0.2)	30 <sup>^</sup> (1.0)	37 <sup>^</sup> (0.2)
2011	52 (1.3)	53 <sup>^</sup> (0.2)	28 <sup>^</sup> (1.2)	35 (0.2)

<sup>^</sup> Result significantly higher than 2019

Students Confident in Science – Primary 4 / Secondary 2				
	Very Confident in Science			
	Percentage of Primary 4 Students		Percentage of Secondary 2 Students	
	Hong Kong	International	Hong Kong	International
2019	23 (0.9)	38 (0.2)	11 (0.6)	23 (0.2)
2015	25 (1.2)	40 <sup>^</sup> (0.2)	13 <sup>^</sup> (0.6)	22 <sup>#</sup> (0.2)
2011	25 (0.9)	43 <sup>^</sup> (0.2)	8 <sup>#</sup> (0.6)	20 <sup>#</sup> (0.2)

<sup>^</sup> Result significantly higher than 2019

<sup>#</sup> Result significantly lower than 2019



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政策二十一 49

# Trends in Attitudinal Results

Students Value Science – Secondary 2		
	Strongly Value Science Percentage of Secondary 2 Students	
	Hong Kong	International
2019	23 (0.9)	36 (0.2)
2015	24 (1.0)	40 <sup>^</sup> (0.2)
2011	26 <sup>^</sup> (1.0)	41 <sup>^</sup> (0.2)

<sup>^</sup> Result significantly higher than 2019



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# HOME RESOURCES



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政策二十一 51

# Home Resources for Learning (Primary 4)

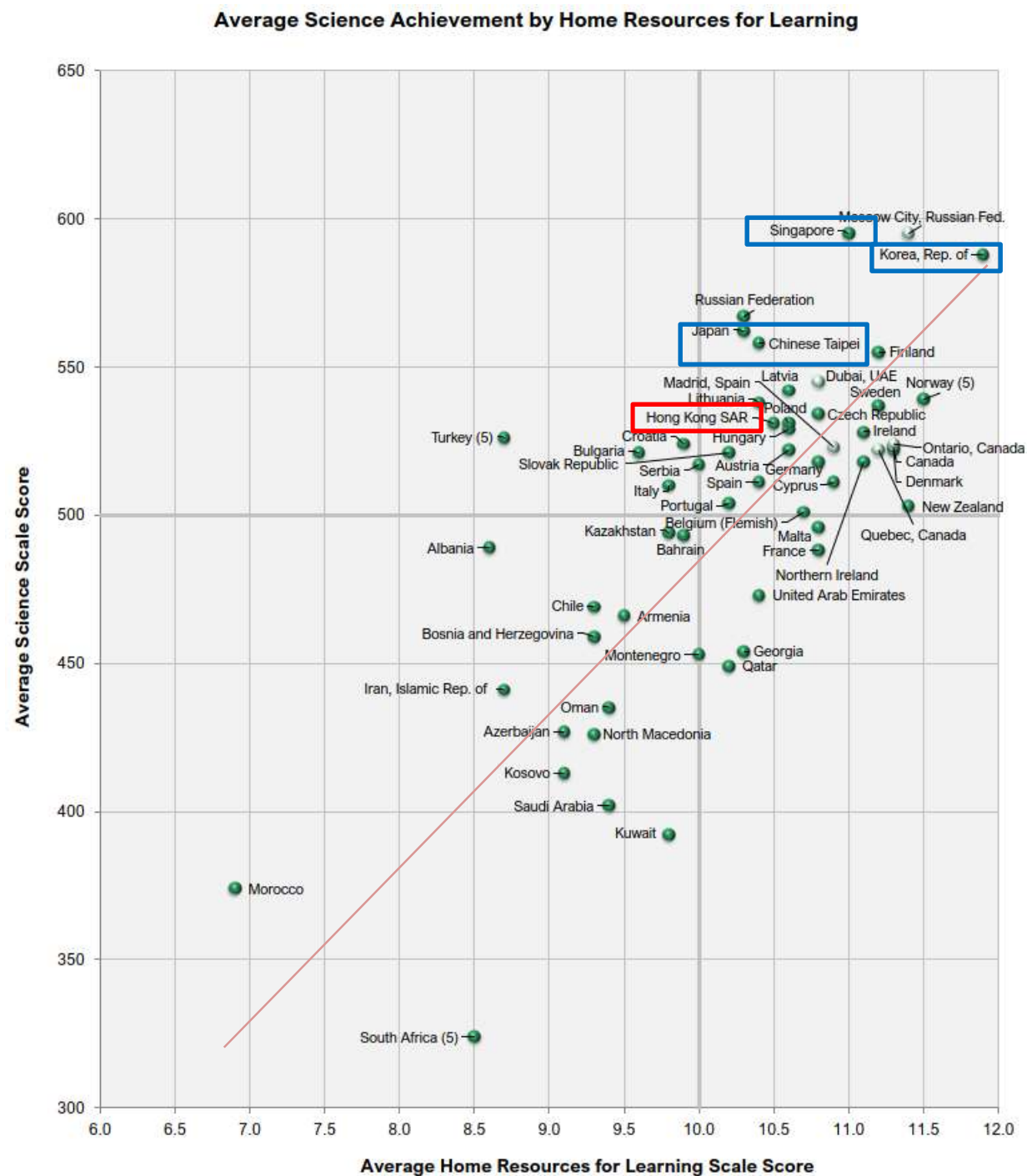
	Many Resources	Some Resources	Few Resources
<b>Primary 4</b>			
HKSAR % (Scale Avg.)	27% (570)	67% (521)	6% (492)
Int'l % (Scale Avg.)	17% (557)	75% (488)	8% (414)





## Primary 4

# Home Resources for Learning



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# Home Educational Resources (Secondary 2)

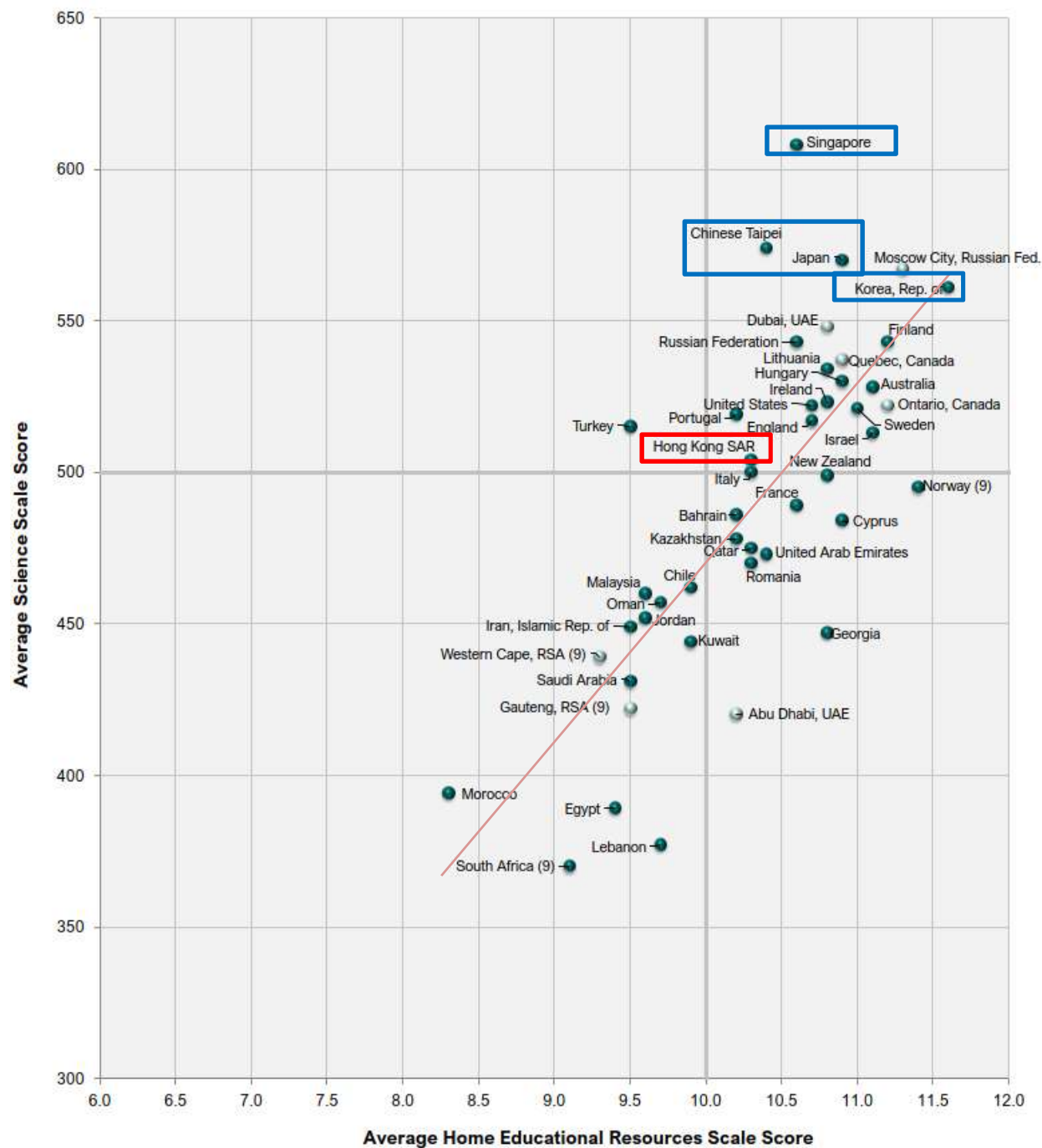
	Many Resources	Some Resources	Few Resources
<b>Secondary 2</b>			
HKSAR % (Scale Avg.)	13% (553)	74% (500)	13% (473)
Int'l % (Scale Avg.)	14% (549)	73% (489)	13% (431)



## Secondary 2

## Home Educational Resources

Average Science Achievement by Home Educational Resources





# Some Observations for Science



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政策二十一 56

# Observations for Science

- ❖ There is a significant decrease in the science performance of Hong Kong students in this cycle
- ❖ The change in assessment mode seems to have a greater impact on our students' science achievement, especially for our S2 students, where the difference in S2 students' performance in science between eTIMSS & Bridge study is highly significant
- ❖ 96% of our P4 students doing the e-assessment have reached the “lowest” international benchmark of science. Only 85% of the S2 students have reached the “lowest” level (as compared to 93% of S2 in the Bridge study)

# Observations for Science

- ❖ What could be the reason for the drop in science achievement in TIMSS 2019 apart from the change in testing mode?

→ Fewer multiple-choice/selected-response (MC) items and more constructed-response (CR) items?

P4: T19: 61% (MC) / 39% (CR)

T15: 58.5% (MC) / 41.5% (CR)

T11: 57.1% (MC) / 42.9% (CR)

S2: T19: 60% (MC) / 40% (CR)

T15: 57.8% (MC) / 42.2% (CR)

T11: 51.0% (MC) / 49.0% (CR)





# Observations for Science

- ❖ What could be the cause of the drop in science achievement in TIMSS 2019 apart from the change in testing mode?

→ Decrease in instructional hours for science?

P4: T19: 85 hours (8.3% of total instructional hrs)

T15: 88 hours (8.8% of total instructional hrs)

T11: 88 hours (8.3% of total instructional hrs)

S2: T19: 104 hours (10.4% of total instructional hrs)

T15: 102 hours (10.3% of total instructional hrs)

T11: 103 hours (10.0% of total instructional hrs)



# Observations for Science

- ❖ What could be the cause of the drop in science achievement in TIMSS 2019 apart from the change in testing mode?

→ Higher percentage omitted (OM)/not-reached (NR) for eTIMSS?

P4: T19e: 3.3% (OM) / 0.5% (NR)

T19b: 5.1% (OM) / 0.1% (NR)

T15: 2.4% (OM) / 0.2% (NR)

S2: T19e: 4.8% (OM) / 0.5% (NR)

T19b: 4.9% (OM) / 0.4% (NR)

T15: 3.1% (OM) / 0.1% (NR)

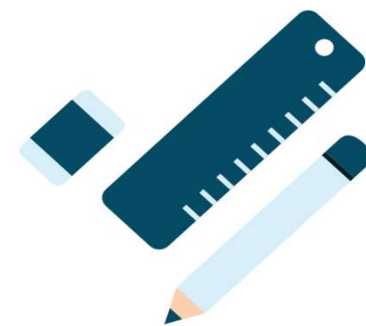
(\*Provisional)



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政策二十一 60



# TIMSS 2019 MATHEMATICS ACHIEVEMENT



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政策二十一 <sup>61</sup>

# Primary 4 Mathematics

Mathematics • Grade 4

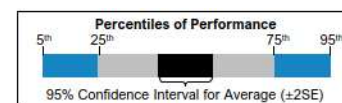
IEA  
TIMSS  
2019

Exhibit 1.1: Average Mathematics Achievement and Scale Score Distributions

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Country	Average Scale Score	Mathematics Achievement Distribution
<sup>3</sup> Singapore	625 (3.9) ▲	
† Hong Kong SAR	602 (3.3) ▲	
Korea, Rep. of	600 (2.2) ▲	
Chinese Taipei	599 (1.9) ▲	
Japan	593 (1.8) ▲	
<sup>2</sup> Russian Federation	567 (3.3) ▲	
† Northern Ireland	566 (2.7) ▲	
<sup>2</sup> England	556 (3.0) ▲	
Ireland	548 (2.5) ▲	
<sup>2</sup> Latvia	546 (2.6) ▲	
† Norway (5)	543 (2.2) ▲	
<sup>2</sup> Lithuania	542 (2.8) ▲	
Austria	539 (2.0) ▲	
≡ Netherlands	538 (2.2) ▲	
<sup>2</sup> † United States	535 (2.5) ▲	

▲ Average significantly higher than the centerpoint of the TIMSS scale  
▼ Average significantly lower than the centerpoint of the TIMSS scale



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政策二十一

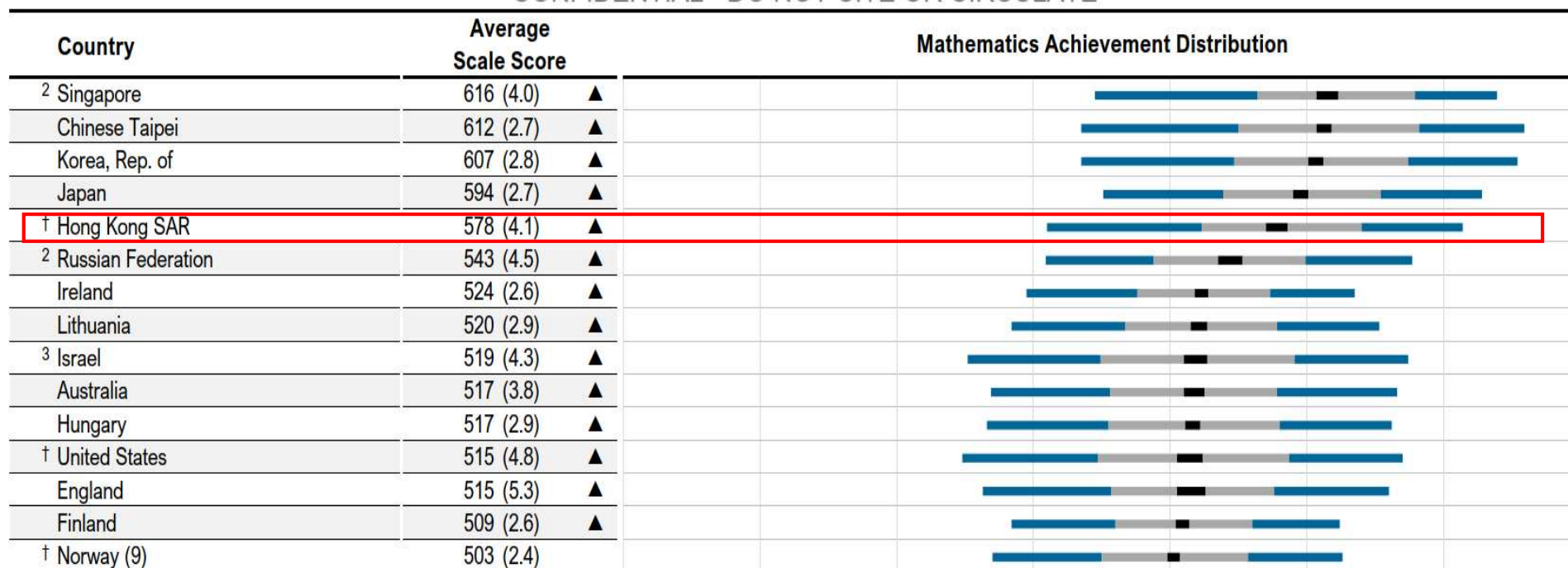
# Secondary 2 Mathematics

Mathematics • Grade 8

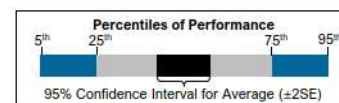
IEA  
TIMSS  
2019

Exhibit 3.1: Average Mathematics Achievement and Scale Score Distributions

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▲ Average significantly higher than the centerpoint of the TIMSS scale  
▼ Average significantly lower than the centerpoint of the TIMSS scale



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政策二十一 63

# Hong Kong Results in TIMSS 2019

❖ Mathematics (TIMSS Scale Average: 500)

P.4: TIMSS scale score: 602 (2<sup>nd</sup>)

(Singapore: 625 (1<sup>st</sup>), Korea: 600 (3<sup>rd</sup>), Chinese Taipei: 599 (4<sup>th</sup>), Japan: 593 (5<sup>th</sup>))

(\*No sign. diff. in achievement between 2<sup>nd</sup> and 4<sup>th</sup> places)

S.2: TIMSS scale score: 578 (5<sup>th</sup>)

(Singapore: 616 (1<sup>st</sup>), Chinese Taipei: 612 (2<sup>nd</sup>), Korea: 607 (3<sup>rd</sup>), Japan: 594 (4<sup>th</sup>))

(\*Sign. lower than the achievement of the first four places)



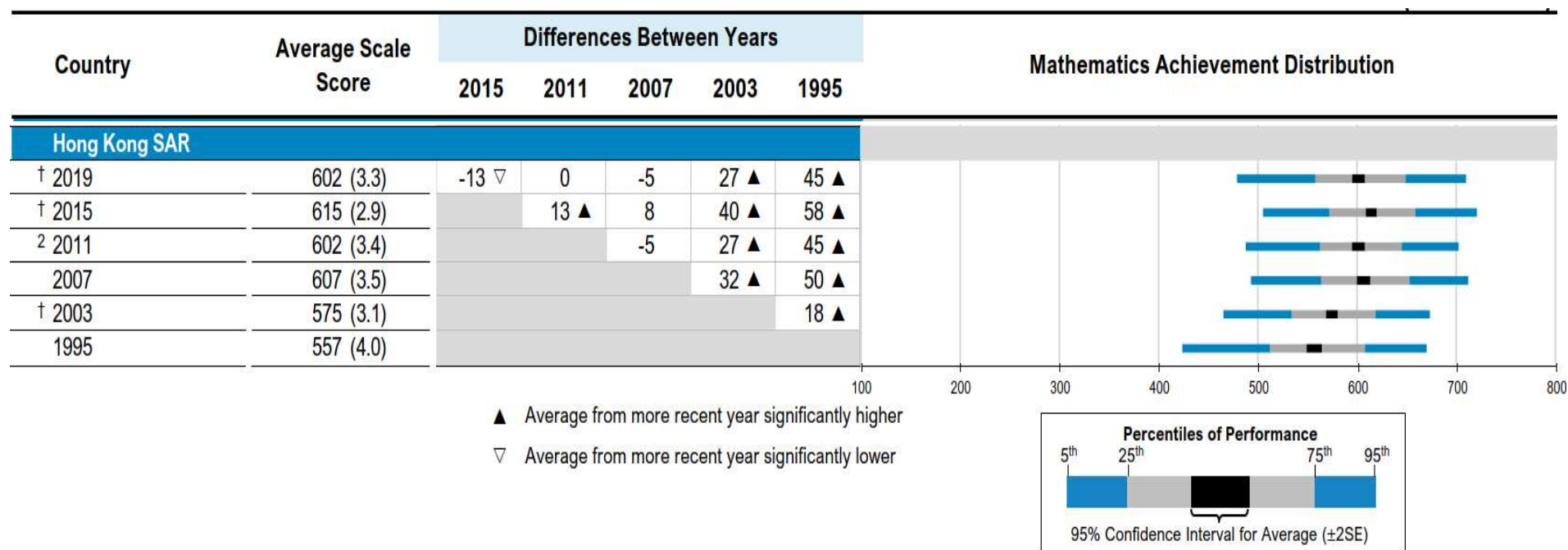
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# Trends in Hong Kong Achievement (Primary 4)

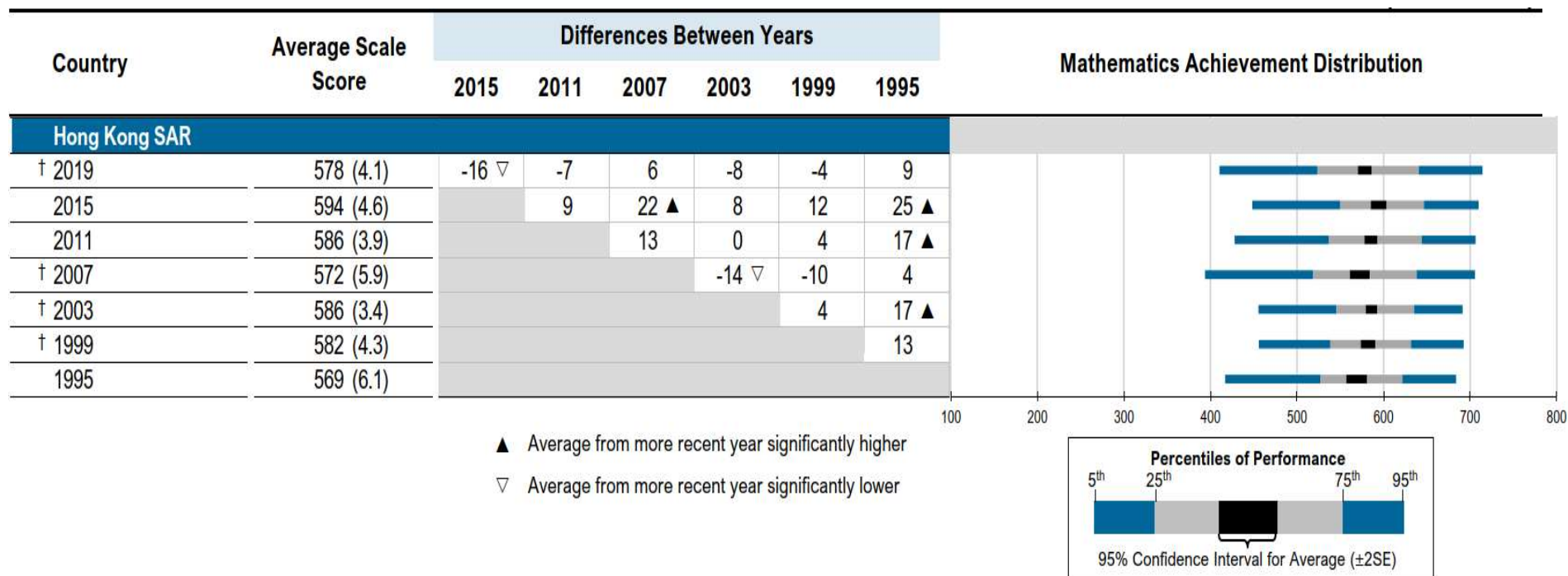


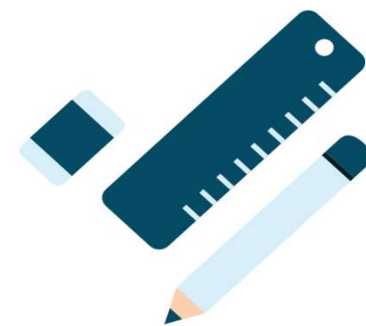
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政策二十一 65

# Trends in Hong Kong Achievement (Secondary 2)





# INTERNATIONAL BENCHMARKS OF MATHEMATICS



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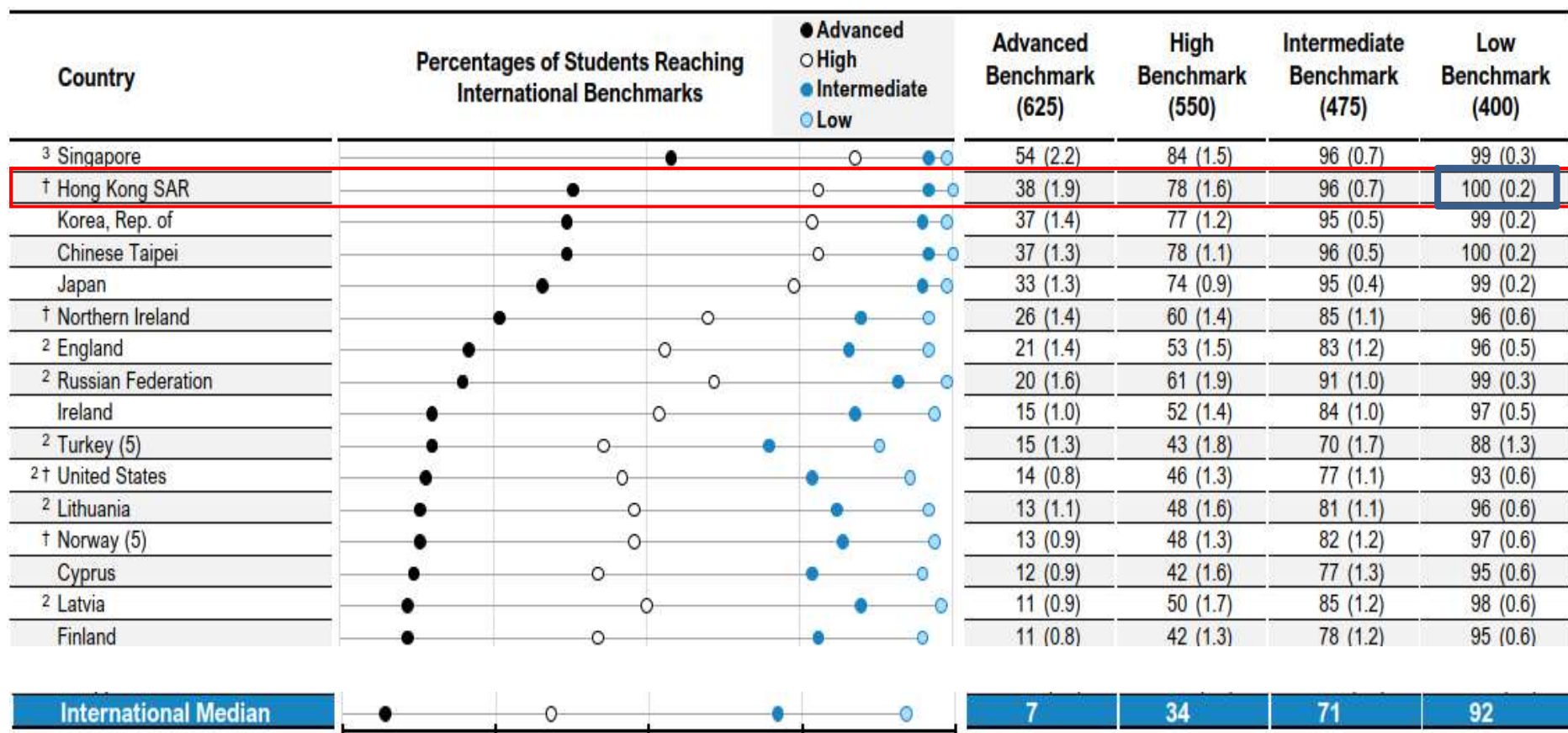
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政策二十一 <sup>67</sup>

# International Benchmarks

- ❖ 4 levels of International Benchmarks: Advanced (625), High (550), Intermediate (475) and Low (400)
- ❖ Students at each benchmark are expected to have the ability to solve problems at certain difficulty levels
- ❖ Students at higher benchmarks are more capable in applying their understanding and knowledge when solving more complex situations and problems than students at the lower benchmarks
- ❖ TIMSS Low Int'l Benchmarks is considered equivalent to the min. proficiency level as defined by UN's Sustainable Development Goal & informs on SDG 4.1 global indicator



# International Benchmarks (P4)





# International Benchmarks: Trend

Percentages of Students Reaching the International Benchmarks of Mathematics Achievement Across Assessment Years (Primary 4)

	Advanced	High	Intermediate	Low
<b>Primary 4</b>				
2019	38%	78%	96%	100%
2015	45%#	84%#	98%#	100%
2011	37%	80%	96%	99%
2007	40%	81%	97%	100%
2003	22%*	67%*	94%*	99%
1995	17%*	56%*	87%*	97%*

\*TIMSS 2019 percent significantly higher

# TIMSS 2019 percent significantly lower

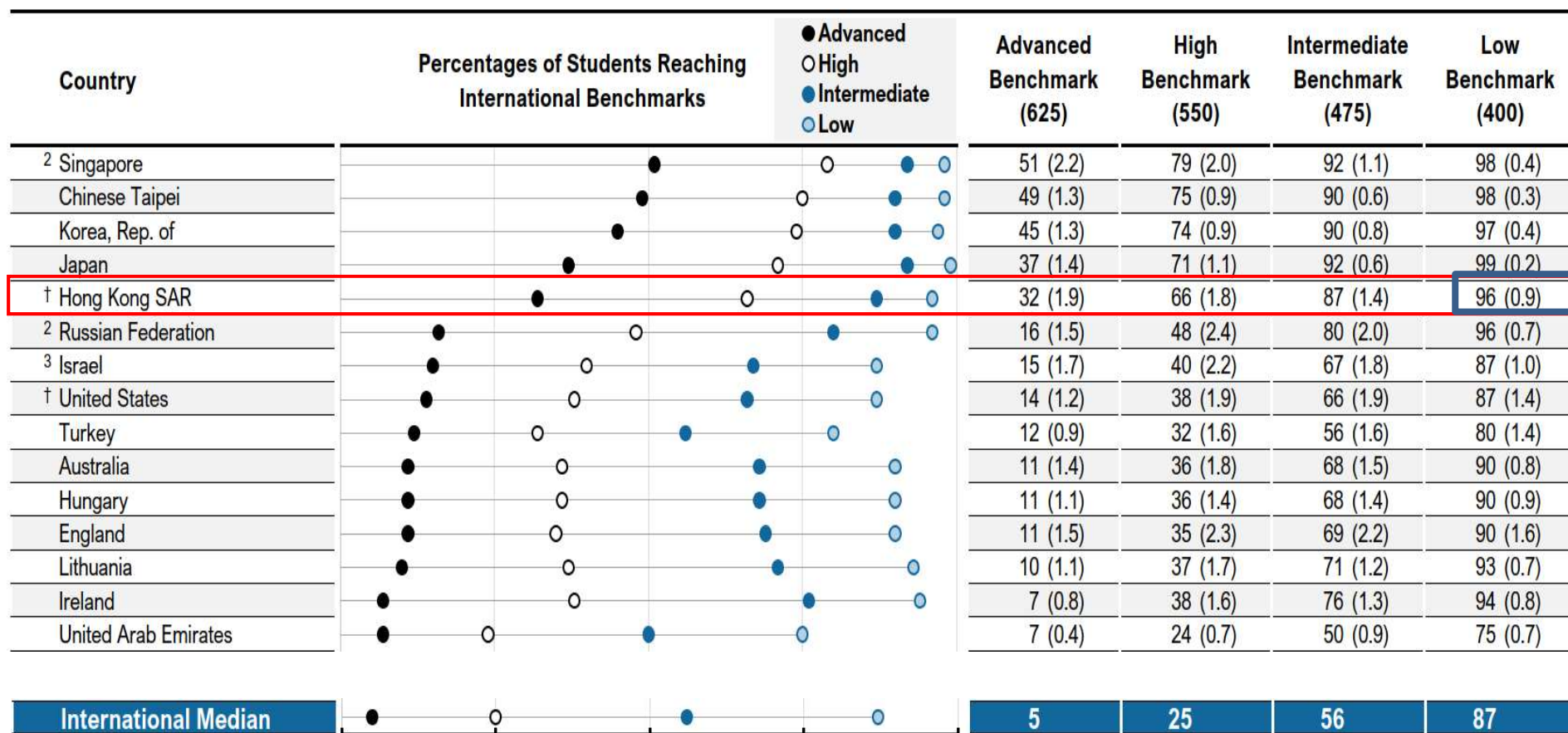


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# International Benchmarks (S2)



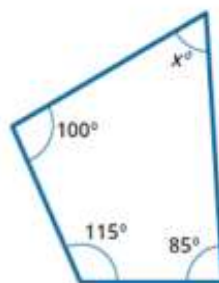
## ❖ Example of an Intermediate Benchmark Item – Secondary 2

Country	Percent Full Credit
<sup>2</sup> Singapore	90 (1.0) ▲
Japan	89 (1.1) ▲
Korea, Rep. of	86 (2.0) ▲
Chinese Taipei	83 (1.5) ▲
† Hong Kong SAR	81 (2.2) ▲
Ireland	78 (1.9) ▲
Hungary	71 (3.0) ▲
England	70 (2.5) ▲
Lithuania	69 (2.2) ▲
<sup>2</sup> Russian Federation	65 (2.8) ▲
Cyprus	63 (2.0) ▲
† Norway (9)	62 (2.1) ▲
Australia	61 (2.0) ▲
Turkey	61 (2.5) ▲
<sup>2</sup> Kazakhstan	60 (2.7)
Romania	59 (2.3)
Finland	58 (2.2)
Portugal	57 (3.0)
<b>International Average</b>	<b>56 (0.4)</b>
Italy	55 (2.6)
<sup>1</sup> Georgia	54 (2.7)
Bahrain	54 (2.5)
<sup>2</sup> Sweden	52 (2.1)
Malaysia	52 (2.1)
Lebanon	51 (2.9)

**Content Domain:** Geometry

**Cognitive Domain:** Applying

**Description:** Determines the value of an angle in an irregular quadrilateral given the values of the other angles



What is the value of  $x$ ?

$x =$

The answer shown illustrates the type of response that would receive full credit (1 point).



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政策二十一 <sup>72</sup>

## ❖ Example of a High Benchmark Item – Secondary 2

Country	Percent Correct	
Korea, Rep. of	70 (2.0)	▲
<sup>2</sup> Singapore	69 (1.9)	▲
Japan	65 (1.8)	▲
Chinese Taipei	63 (2.1)	▲
Ireland	57 (2.4)	▲
Australia	56 (2.0)	▲
Turkey	55 (2.2)	▲
Bahrain	52 (2.1)	▲
† United States	52 (2.2)	▲
England	50 (2.2)	▲
† Hong Kong SAR	49 (2.9)	▲
Finland	49 (2.1)	▲
Italy	48 (2.5)	▲
† New Zealand	48 (2.3)	▲
† Norway (9)	48 (2.8)	
Lithuania	46 (2.7)	
<sup>3</sup> Israel	46 (2.7)	
Iran, Islamic Rep. of	45 (2.8)	
<b>International Average</b>	<b>43 (0.4)</b>	
Hungary	43 (2.3)	
<sup>2</sup> Russian Federation	42 (2.6)	
<sup>2</sup> Sweden	42 (2.7)	

**Content Domain:** Data and Probability

**Cognitive Domain:** Applying

**Description:** Estimates the number of objects in a given probability sample

A bag contains 24 marbles, some white and some black.

A marble is chosen at random, its color is noted, and the marble is placed back into the bag. This is done 120 times, and a white marble appears 70 times.

How many white marbles are likely to be in the bag?

**A** 7

**B** 10

**C** 12

**D** 14





## ❖ Example of an Advanced Benchmark Item – Secondary 2

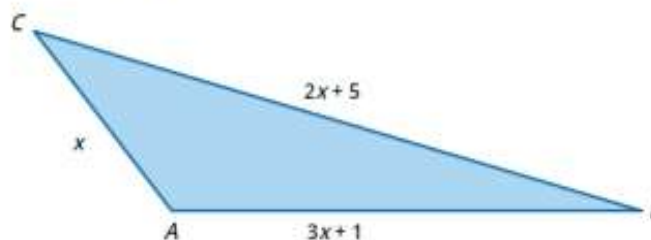
Country	Percent Full Credit
<sup>2</sup> Singapore	74 (2.1) ▲
Chinese Taipei	66 (1.8) ▲
<sup>†</sup> Hong Kong SAR	61 (2.4) ▲
Korea, Rep. of	59 (2.8) ▲
<sup>3</sup> Israel	46 (2.7) ▲
Japan	42 (2.1) ▲
Cyprus	41 (2.3) ▲
<sup>2</sup> Russian Federation	40 (3.0) ▲
Romania	36 (2.8) ▲
Lithuania	34 (2.4) ▲
<sup>2</sup> Sweden	34 (2.2) ▲
Hungary	33 (2.6) ▲
<sup>2</sup> Kazakhstan	30 (2.2)
Australia	29 (1.8)
<b>International Average</b>	<b>26 (0.3)</b>
<sup>1</sup> Georgia	26 (2.7)
United Arab Emirates	25 (0.9)
Bahrain	25 (1.7)
<sup>†</sup> United States	24 (1.8)
Turkey	23 (2.1)
Ireland	23 (1.7)
England	22 (2.5)

**Content Domain:** Algebra

**Cognitive Domain:** Applying

**Description:** Constructs a linear equation for the perimeter of a triangle and solves for the length of one side

The perimeter of triangle  $ABC$  is 21 cm.



What is the value of  $x$ ?

$x =$   cm

The answer shown illustrates the type of response that would receive full credit (1 point).



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# International Benchmarks: Trend

Percentages of Students Reaching the International Benchmarks of Mathematics Achievement Across Assessment Years (Secondary 2)

	Advanced	High	Intermediate	Low
<b>Secondary 2</b>				
2019	32%	66%	87%	96%
2015	37%	75%#	92%#	98%
2011	34%	71%	89%	97%
2007	31%	64%	85%	94%
2003	31%	73%#	93%#	98%#
1999	28%	70%	92%#	98%#
1995	23%*	65%	88%	96%

\*TIMSS 2019 percent significantly higher

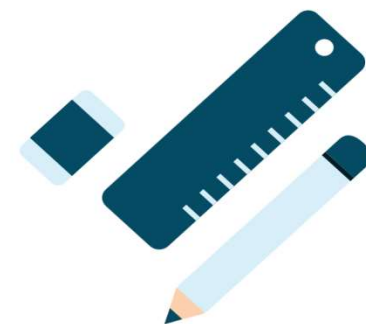
# TIMSS 2019 percent significantly lower



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# GENDER AND MATHEMATICS ACHIEVEMENT



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政策二十一 76

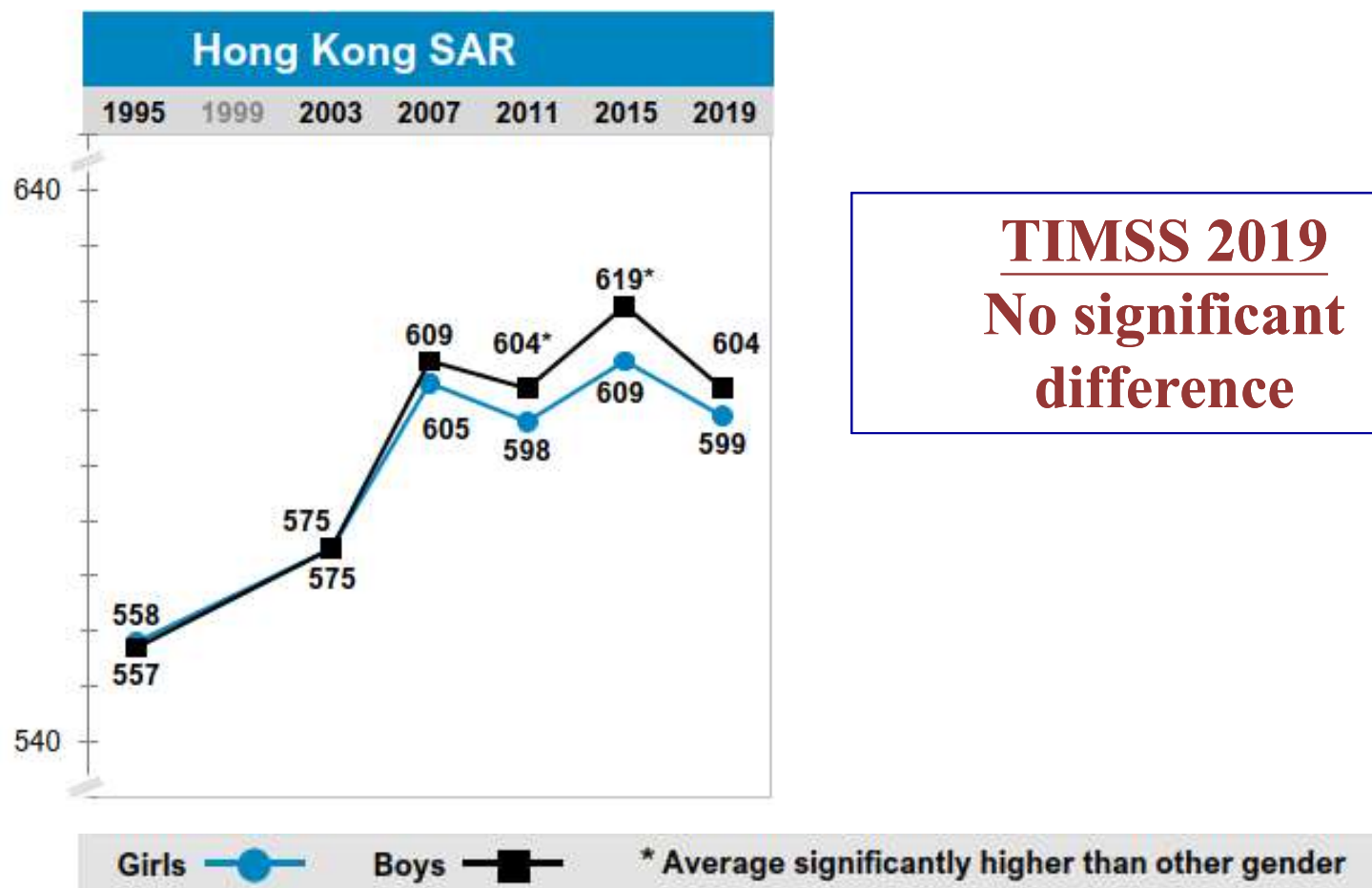
Country	Girls		Boys		Difference (Absolute Value)	Gender Difference	
	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score		Girls Scored Higher	Boys Scored Higher
<sup>2</sup> Philippines	48 (0.7)	315 (6.6)	52 (0.7)	280 (6.4)	35 (3.7)		
<sup>2</sup> Saudi Arabia	48 (0.8)	412 (4.9)	52 (0.8)	385 (5.8)	26 (8.1)		
South Africa (5)	50 (0.6)	384 (4.0)	50 (0.6)	364 (3.7)	20 (2.9)		
<sup>2</sup> Pakistan	45 (4.7)	338 (16.4)	55 (4.7)	319 (11.8)	19 (16.0)		
Oman	50 (0.7)	438 (3.6)	50 (0.7)	424 (4.4)	14 (2.9)		
Kuwait	47 (2.6)	387 (6.0)	53 (2.6)	380 (6.9)	7 (8.9)		
Bahrain	49 (1.2)	482 (3.2)	51 (1.2)	477 (3.5)	5 (4.3)		
Azerbaijan	47 (0.9)	517 (3.1)	53 (0.9)	514 (3.1)	4 (3.0)		
Morocco	49 (0.7)	385 (4.8)	51 (0.7)	382 (4.3)	3 (2.9)		
Armenia	48 (0.8)	499 (2.6)	52 (0.8)	497 (3.2)	2 (2.8)		
<sup>2</sup> Serbia	50 (0.9)	509 (3.4)	50 (0.9)	507 (4.0)	2 (3.9)		
Qatar	50 (1.5)	450 (5.1)	50 (1.5)	449 (3.2)	1 (5.2)		
Japan	48 (0.5)	593 (2.2)	52 (0.5)	593 (1.9)	1 (2.2)		
<sup>2</sup> Kazakhstan	49 (0.7)	512 (3.0)	51 (0.7)	512 (2.6)	0 (2.4)		
North Macedonia	48 (0.6)	472 (5.9)	52 (0.6)	472 (5.4)	0 (4.0)		
Bulgaria	48 (0.9)	514 (4.7)	52 (0.9)	516 (4.6)	2 (3.6)		
Finland	49 (0.9)	531 (2.9)	51 (0.9)	533 (2.8)	3 (3.2)		
Albania	49 (0.9)	493 (3.8)	51 (0.9)	495 (3.9)	3 (3.6)		
<sup>†</sup> Northern Ireland	50 (1.0)	564 (3.2)	50 (1.0)	568 (3.7)	3 (4.2)		
<sup>2</sup> Turkey (5)	52 (1.4)	521 (4.5)	48 (1.4)	525 (5.6)	3 (4.9)		
Chinese Taipei	48 (0.6)	597 (2.4)	52 (0.6)	601 (2.3)	4 (2.7)		
<sup>†</sup> Norway (5)	48 (0.9)	540 (2.7)	52 (0.9)	545 (2.9)	4 (3.5)		
<sup>2</sup> Kosovo	49 (1.0)	442 (3.1)	51 (1.0)	447 (3.7)	5 (3.3)		
<sup>2</sup> Lithuania	49 (0.9)	540 (2.9)	51 (0.9)	544 (3.7)	5 (3.8)		
<sup>2</sup> Latvia	50 (0.9)	544 (2.9)	50 (0.9)	548 (3.0)	5 (2.7)		
Montenegro	47 (0.6)	450 (2.6)	53 (0.6)	455 (2.4)	5 (3.0)		
Korea, Rep. of	47 (0.7)	597 (2.3)	53 (0.7)	602 (2.8)	5 (2.5)		
<sup>2</sup> New Zealand	48 (1.3)	484 (3.7)	52 (1.3)	490 (3.3)	5 (4.6)		
<sup>†</sup> Hong Kong SAR	46 (1.3)	599 (3.5)	54 (1.3)	604 (3.9)	6 (3.3)		
Ireland	50 (1.1)	545 (3.2)	50 (1.1)	552 (2.9)	7 (3.7)		
<sup>†</sup> Denmark	50 (0.8)	521 (2.2)	50 (0.8)	528 (2.6)	7 (2.9)		
Sweden	50 (1.1)	518 (3.2)	50 (1.1)	525 (3.1)	7 (2.8)		
<sup>2</sup> England	50 (1.0)	552 (4.0)	50 (1.0)	560 (3.0)	7 (3.8)		
Iran, Islamic Rep. of	49 (2.1)	439 (6.4)	51 (2.1)	447 (5.3)	7 (8.8)		
Malta	49 (0.7)	505 (2.1)	51 (0.7)	513 (1.9)	7 (2.7)		
<sup>1</sup> Georgia	49 (0.9)	478 (3.9)	51 (0.9)	486 (4.1)	7 (3.3)		
Austria	49 (1.0)	535 (2.8)	51 (1.0)	543 (2.1)	8 (2.9)		
<sup>3</sup> Singapore	49 (0.5)	621 (4.0)	51 (0.5)	629 (4.2)	8 (2.8)		
Poland	49 (0.8)	516 (3.0)	51 (0.8)	524 (3.0)	8 (2.8)		
United Arab Emirates	50 (1.1)	477 (2.5)	50 (1.1)	486 (2.3)	8 (3.4)		
<sup>2</sup> Russian Federation	51 (1.1)	563 (3.6)	49 (1.1)	571 (3.5)	8 (2.5)		
<sup>■</sup> Netherlands	49 (1.0)	533 (2.2)	51 (1.0)	542 (3.0)	9 (3.0)		
Chile	50 (1.3)	437 (3.4)	50 (1.3)	445 (3.1)	9 (3.7)		
Bosnia and Herzegovina	49 (0.7)	447 (2.7)	51 (0.7)	456 (2.8)	9 (2.6)		
Australia	49 (0.8)	511 (2.9)	51 (0.8)	521 (3.3)	10 (2.9)		
Germany	50 (0.8)	516 (2.8)	50 (0.8)	526 (2.4)	10 (2.5)		
<sup>†</sup> Belgium (Flemish)	51 (0.8)	527 (2.1)	49 (0.8)	538 (2.8)	11 (3.2)		
Czech Republic	49 (0.9)	527 (2.7)	51 (0.9)	538 (3.1)	11 (2.9)		
<sup>2</sup> United States	49 (0.8)	529 (3.0)	51 (0.8)	540 (2.9)	11 (2.9)		
Hungary	48 (1.0)	518 (3.0)	52 (1.0)	529 (3.1)	11 (3.0)		
Croatia	50 (1.2)	504 (2.6)	50 (1.2)	515 (2.7)	12 (3.1)		
Italy	50 (0.8)	509 (2.7)	50 (0.8)	521 (3.2)	12 (3.4)		
<sup>2</sup> Slovak Republic	49 (1.0)	503 (3.5)	51 (1.0)	516 (4.2)	12 (3.6)		
France	49 (1.0)	478 (3.3)	51 (1.0)	491 (3.5)	14 (3.0)		
Spain	47 (0.8)	495 (2.5)	53 (0.8)	509 (2.6)	15 (2.8)		
<sup>2</sup> Portugal	48 (0.9)	516 (2.9)	52 (0.9)	533 (2.9)	17 (2.6)		
Cyprus	52 (0.7)	523 (3.0)	48 (0.7)	542 (3.5)	19 (3.2)		
<sup>1,2</sup> Canada	49 (0.8)	502 (2.5)	51 (0.8)	521 (2.0)	19 (2.4)		
International Average	49 (0.2)	499 (0.5)	51 (0.2)	503 (0.5)			

# TIMSS 2019

## Gender & Mathematics Achievement (Primary 4)

■ Difference statistically significant  
■ Difference not statistically significant

# Gender and Achievement (Primary 4)



**TIMSS 2019**  
**No significant  
difference**



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Country	Girls		Boys		Difference (Absolute Value)	Gender Difference	
	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score		Girls Scored Higher	Boys Scored Higher
ψ Oman	48 (1.1)	432 (3.3)	52 (1.1)	391 (4.0)	41 (4.8)		
ψ Jordan	48 (3.4)	432 (3.8)	52 (3.4)	409 (6.4)	23 (6.7)		
Bahrain	49 (0.9)	492 (2.4)	51 (0.9)	471 (2.2)	21 (3.0)		
<sup>2</sup> ψ Saudi Arabia	49 (0.9)	403 (3.4)	51 (0.9)	385 (3.4)	17 (4.5)		
Romania	51 (0.9)	487 (4.6)	49 (0.9)	471 (4.7)	16 (3.8)		
<sup>2</sup> ψ Egypt	55 (2.0)	420 (5.3)	45 (2.0)	404 (7.9)	16 (8.1)		
Iran, Islamic Rep. of	47 (1.3)	453 (5.0)	53 (1.3)	440 (5.6)	13 (7.6)		
Turkey	50 (1.3)	501 (4.4)	50 (1.3)	490 (5.8)	11 (5.7)		
ψ Kuwait	53 (2.2)	407 (5.4)	47 (2.2)	398 (7.9)	9 (8.8)		
Malaysia	51 (1.1)	465 (3.0)	49 (1.1)	456 (4.1)	9 (3.4)		
† Hong Kong SAR	46 (2.1)	582 (4.9)	54 (2.1)	575 (5.4)	7 (6.5)		
ψ Qatar	50 (2.4)	447 (5.0)	50 (2.4)	440 (5.4)	7 (6.6)		
<sup>✱</sup> South Africa (9)	52 (0.6)	393 (2.4)	48 (0.6)	386 (2.5)	6 (2.1)		
United Arab Emirates	48 (1.8)	476 (3.4)	52 (1.8)	471 (3.4)	6 (5.6)		
Finland	48 (0.8)	511 (2.6)	52 (0.8)	507 (3.2)	4 (2.8)		
Cyprus	49 (0.6)	503 (2.1)	51 (0.6)	499 (2.3)	4 (3.0)		
<sup>2</sup> Kazakhstan	49 (1.1)	490 (3.9)	51 (1.1)	486 (3.7)	4 (3.8)		
† United States	49 (0.9)	517 (4.0)	51 (0.9)	514 (6.1)	4 (3.9)		
<sup>2</sup> Singapore	49 (0.7)	617 (4.6)	51 (0.7)	614 (4.4)	3 (4.2)		
<sup>2</sup> Sweden	49 (0.9)	504 (3.0)	51 (0.9)	501 (2.9)	3 (3.1)		
Chinese Taipei	50 (0.9)	614 (3.1)	50 (0.9)	611 (3.2)	2 (3.3)		
Ireland	49 (1.1)	524 (2.9)	51 (1.1)	523 (3.4)	1 (3.5)		
† Norway (9)	49 (0.7)	503 (2.7)	51 (0.7)	503 (3.0)	0 (3.2)		
England	53 (1.9)	514 (5.6)	47 (1.9)	516 (7.2)	2 (7.3)		
Lithuania	50 (1.0)	519 (2.8)	50 (1.0)	521 (3.7)	2 (2.9)		
Japan	52 (1.0)	593 (2.9)	48 (1.0)	595 (3.2)	2 (2.8)		
Australia	49 (1.5)	515 (3.6)	51 (1.5)	519 (5.5)	4 (5.4)		
ψ Morocco	50 (0.7)	386 (2.5)	50 (0.7)	391 (2.6)	5 (2.2)		
<sup>2</sup> Russian Federation	48 (1.0)	541 (4.8)	52 (1.0)	546 (4.9)	5 (3.4)		
Korea, Rep. of	48 (1.4)	604 (3.4)	52 (1.4)	609 (3.1)	5 (3.4)		
Lebanon	49 (1.4)	427 (3.5)	51 (1.4)	432 (3.3)	5 (3.5)		
† New Zealand	48 (2.1)	478 (3.6)	52 (2.1)	484 (4.7)	6 (5.2)		
France	49 (0.8)	478 (2.5)	51 (0.8)	487 (3.1)	8 (2.7)		
<sup>1</sup> Georgia	48 (1.2)	457 (4.5)	52 (1.2)	465 (5.2)	8 (4.5)		
ψ Chile	49 (1.6)	436 (3.5)	51 (1.6)	445 (3.8)	9 (4.6)		
Portugal	50 (1.1)	495 (3.3)	50 (1.1)	505 (3.9)	10 (3.4)		
<sup>3</sup> Israel	52 (1.7)	514 (4.3)	48 (1.7)	525 (5.3)	11 (4.6)		
Italy	50 (1.0)	491 (3.0)	50 (1.0)	504 (3.3)	12 (3.0)		
Hungary	50 (0.9)	510 (3.2)	50 (0.9)	524 (3.6)	14 (3.5)		
International Average	50 (0.2)	491 (0.6)	50 (0.2)	488 (0.7)			

## TIMSS 2019 Gender & Mathematics Achievement (Secondary 2)

■ Difference statistically significant  
■ Difference not statistically significant



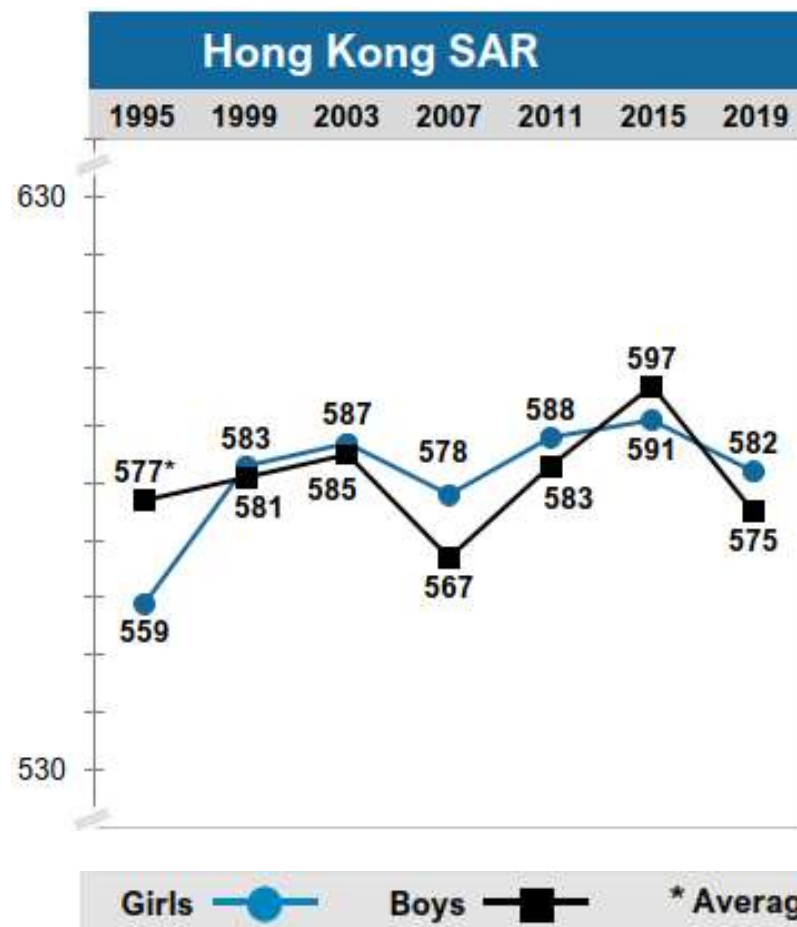
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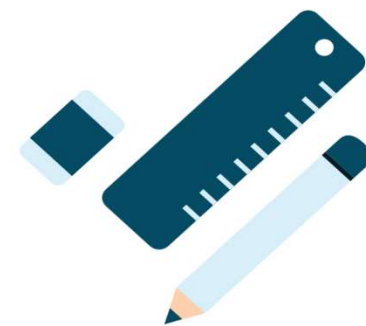


# Gender and Achievement (S2)



**TIMSS 2019**  
**No significant  
difference**





# CONTENT AND COGNITIVE DOMAINS OF MATHEMATICS



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# Content and Cognitive Domains

- ❖ TIMSS assessment is organized around two dimensions, a content dimension and a cognitive dimension
- ❖ A content dimension specifies the content to be assessed & cognitive dimension specifies the thinking processes to be assessed
- ❖ Content domains of mathematics:
  - P4: Number, Measurement & Geometry, Data
  - S2: Number, Algebra, Geometry, Data and Probability
- ❖ Content domains of science:
  - P4: Life Science, Physical Science, Earth Science
  - S2: Biology, Chemistry, Physics, Earth Science
- ❖ Cognitive domains: Knowing, Applying, Reasoning



# Content and Cognitive Domains

<b>Primary 4</b>	<b>Number</b>	<b>Measurement &amp; Geometry</b>	<b>Data</b>
<b>HKSAR</b>	<b>598</b>	<b>608</b>	<b>607</b>
	<b>Knowing</b>	<b>Applying</b>	<b>Reasoning</b>
<b>HKSAR</b>	<b>600</b>	<b>606</b>	<b>596</b>

<b>Secondary 2</b>	<b>Number</b>	<b>Algebra</b>	<b>Geometry</b>	<b>Data &amp; Probability</b>
<b>HKSAR</b>	<b>570</b>	<b>584</b>	<b>596</b>	<b>563</b>
	<b>Knowing</b>	<b>Applying</b>	<b>Reasoning</b>	
<b>HKSAR</b>	<b>580</b>	<b>575</b>	<b>582</b>	



# Content and Cognitive Domains by Gender (Primary 4)

Primary 4	Number			Measurement & Geometry			Data	
	Girls	Boys		Girls	Boys		Girls	Boys
HKSAR	595	600		600	615*		607	607
International	505	509*		500	507*		498	499

Primary 4	Knowing			Applying			Reasoning	
	Girls	Boys		Girls	Boys		Girls	Boys
HKSAR	594	605*		604	608		590	601*
International	500	507*		505	506*		500	507*

\*Achievement significantly higher



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# Content and Cognitive Domains by Gender (Secondary 2)

Secondary 2	Number		Algebra		Geometry		Data & Probability	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
HKSAR	570	569	588	580	602	591	571*	555
International	493	497*	503*	493	499*	495	490	489

Secondary 2	Knowing		Applying		Reasoning	
	Girls	Boys	Girls	Boys	Girls	Boys
HKSAR	584	577	580	572	584	580
International	498*	494	496	495	500*	496

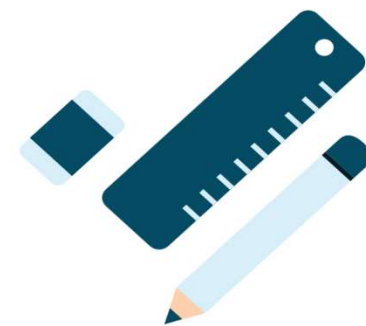
\*Achievement significantly higher



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# ATTITUDINAL RESULTS



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# Attitudinal Results (Primary 4)

Primary 4	Students Very Much Like Learning Mathematics	Students Somewhat Like Learning Mathematics	Students Do Not Like Learning Mathematics
HKSAR % (Scale Avg.)	30% (626)	38% (596)	32% (585)
Int'l % (Scale Avg.)	45% (520)	35% (491)	20% (479)

Primary 4	Students Very Confident in Mathematics	Students Somewhat Confident in Mathematics	Students Not Confident in Mathematics
HKSAR % (Scale Avg.)	18% (652)	43% (606)	39% (573)
Int'l % (Scale Avg.)	32% (545)	44% (487)	23% (456)



Country	Very Much Like Learning Mathematics		Somewhat Like Learning Mathematics		Do Not Like Learning Mathematics		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	83 (1.2)	504 (3.2)	15 (1.0)	455 (7.6)	2 (0.4)	~ ~	11.8 (0.05)
Kosovo	78 (0.9)	459 (2.7)	20 (0.8)	404 (4.7)	2 (0.3)	~ ~	11.4 (0.04)
Georgia	74 (1.5)	489 (3.7)	22 (1.1)	459 (6.6)	4 (0.6)	446 (11.3)	11.4 (0.06)
Armenia	72 (1.1)	511 (2.6)	23 (1.0)	481 (4.0)	5 (0.4)	465 (5.6)	11.4 (0.05)
Morocco	70 (1.2)	402 (4.1)	25 (1.1)	344 (6.4)	5 (0.4)	326 (10.2)	11.3 (0.05)
Azerbaijan	68 (1.2)	536 (2.3)	27 (1.1)	495 (3.6)	5 (0.4)	477 (7.5)	10.9 (0.05)
Kazakhstan	68 (1.0)	518 (2.6)	28 (1.0)	504 (3.6)	5 (0.5)	494 (6.3)	11.1 (0.05)
Turkey (5)	66 (1.2)	540 (4.1)	25 (0.9)	491 (6.1)	9 (0.6)	495 (7.0)	10.9 (0.05)
North Macedonia	66 (1.3)	495 (5.3)	29 (1.1)	436 (6.8)	5 (0.6)	448 (12.0)	11.0 (0.06)
Montenegro	64 (1.0)	467 (1.9)	25 (0.8)	433 (3.5)	10 (0.6)	427 (5.0)	10.9 (0.04)
Oman	59 (1.2)	455 (4.5)	34 (1.1)	401 (4.7)	7 (0.5)	394 (5.7)	10.8 (0.05)
Iran, Islamic Rep. of	59 (1.4)	457 (3.6)	30 (0.9)	421 (5.2)	11 (0.7)	437 (7.3)	10.8 (0.06)
Saudi Arabia	59 (1.2)	424 (3.6)	30 (1.0)	371 (4.1)	11 (0.8)	370 (8.7)	10.8 (0.05)
Cyprus	56 (1.5)	547 (2.8)	28 (0.9)	522 (3.9)	16 (1.1)	497 (4.9)	10.5 (0.07)
Bahrain	56 (1.4)	494 (2.6)	31 (0.9)	465 (3.2)	13 (0.8)	458 (4.4)	10.6 (0.07)
Bulgaria	54 (1.5)	526 (3.9)	30 (1.1)	508 (5.4)	17 (1.3)	496 (10.1)	10.4 (0.08)
United Arab Emirates	54 (0.7)	503 (1.8)	33 (0.5)	461 (2.3)	13 (0.4)	455 (2.8)	10.5 (0.03)
Portugal	49 (1.3)	542 (2.9)	36 (1.0)	513 (3.1)	15 (0.9)	499 (4.4)	10.3 (0.05)
France	49 (1.0)	499 (3.6)	36 (0.9)	479 (3.9)	15 (0.8)	454 (4.8)	10.2 (0.04)
Bosnia and Herzegovina	49 (1.0)	466 (2.8)	32 (0.6)	443 (3.3)	20 (1.0)	437 (3.4)	10.1 (0.06)
Malta	48 (0.7)	522 (1.7)	34 (0.7)	502 (2.2)	18 (0.7)	488 (3.2)	10.1 (0.03)
Lithuania	47 (1.3)	553 (3.2)	39 (0.9)	538 (3.3)	14 (0.9)	521 (5.7)	10.1 (0.05)
Kuwait	46 (1.6)	416 (6.0)	37 (1.1)	372 (5.5)	17 (1.1)	352 (5.4)	10.2 (0.08)
South Africa (5)	46 (1.5)	415 (3.3)	43 (1.1)	345 (3.7)	12 (0.6)	334 (5.4)	10.3 (0.05)
Italy	45 (1.3)	525 (2.9)	34 (1.1)	511 (3.2)	20 (1.1)	502 (3.5)	10.0 (0.06)
England	44 (1.6)	576 (4.4)	34 (1.1)	549 (4.4)	23 (1.1)	530 (3.8)	9.9 (0.07)
Qatar	43 (1.4)	474 (3.8)	38 (0.9)	434 (4.8)	20 (0.9)	436 (4.9)	10.0 (0.07)
Chile	43 (1.2)	458 (3.2)	39 (0.9)	437 (3.4)	19 (1.0)	418 (4.1)	10.0 (0.05)
Russian Federation	42 (1.1)	579 (4.0)	41 (0.8)	563 (3.5)	17 (0.9)	547 (4.3)	10.0 (0.05)
Austria	40 (1.0)	552 (2.5)	34 (0.8)	538 (2.7)	25 (0.9)	522 (2.9)	9.8 (0.05)
New Zealand	40 (0.9)	503 (3.2)	35 (0.8)	485 (3.6)	25 (0.9)	469 (3.3)	9.8 (0.04)
Australia	40 (1.0)	536 (3.6)	34 (0.9)	516 (3.4)	26 (1.2)	487 (3.6)	9.7 (0.05)
Hungary	38 (1.2)	543 (3.3)	37 (0.9)	517 (3.4)	25 (1.3)	504 (3.4)	9.7 (0.06)
United States	38 (0.9)	559 (2.8)	35 (0.7)	530 (3.7)	27 (0.8)	515 (3.1)	9.7 (0.04)
Canada	38 (0.9)	531 (2.9)	38 (0.8)	508 (2.1)	25 (0.6)	485 (2.5)	9.7 (0.04)
Spain	37 (1.0)	519 (3.5)	39 (0.9)	500 (2.9)	23 (1.1)	484 (2.9)	9.7 (0.04)
Singapore	37 (0.9)	654 (3.5)	40 (0.7)	618 (4.4)	23 (0.8)	594 (4.1)	9.7 (0.04)
Slovak Republic	37 (1.5)	520 (4.4)	39 (1.1)	506 (4.5)	24 (1.0)	500 (3.8)	9.7 (0.06)
Ireland	35 (1.1)	566 (2.9)	37 (1.0)	549 (3.2)	28 (1.1)	529 (3.3)	9.5 (0.05)
Pakistan	35 (3.6)	354 (14.7)	52 (3.2)	318 (11.5)	13 (1.3)	307 (11.5)	9.9 (0.09)
Serbia	35 (1.3)	526 (4.4)	40 (1.1)	505 (3.3)	26 (1.4)	490 (5.1)	9.6 (0.07)
Sweden	34 (1.6)	530 (4.5)	37 (1.1)	523 (3.3)	29 (1.6)	511 (3.2)	9.5 (0.08)
Germany	33 (1.0)	544 (3.1)	38 (1.0)	522 (2.8)	29 (1.2)	503 (3.1)	9.5 (0.05)
Belgium (Flemish)	33 (1.0)	547 (2.8)	39 (0.9)	531 (2.3)	28 (1.0)	518 (2.8)	9.4 (0.04)
Czech Republic	32 (1.2)	553 (3.6)	39 (1.1)	532 (3.2)	28 (1.2)	514 (3.2)	9.4 (0.05)
Latvia	32 (1.2)	565 (3.5)	40 (1.1)	549 (2.7)	28 (1.3)	521 (3.7)	9.5 (0.05)
Norway (5)	32 (1.4)	558 (3.4)	39 (1.1)	541 (3.4)	29 (1.3)	533 (3.4)	9.4 (0.07)
Philippines	32 (1.8)	362 (6.7)	53 (1.3)	278 (6.0)	16 (0.9)	242 (6.8)	9.8 (0.07)
Northern Ireland	31 (1.2)	589 (4.0)	39 (1.1)	572 (3.6)	30 (1.2)	535 (3.8)	9.4 (0.05)
Hong Kong SAR	30 (1.3)	626 (4.9)	38 (1.2)	596 (3.9)	32 (1.4)	585 (3.9)	9.3 (0.06)
Netherlands	30 (1.3)	553 (2.9)	39 (0.8)	536 (2.6)	32 (1.2)	524 (3.2)	9.3 (0.06)
Poland	28 (1.0)	544 (3.4)	41 (0.8)	517 (3.1)	31 (1.2)	505 (3.4)	9.2 (0.05)
Japan	28 (1.0)	622 (2.4)	45 (0.9)	591 (2.2)	27 (1.2)	568 (2.8)	9.4 (0.05)
Denmark	28 (1.2)	543 (3.3)	41 (1.1)	525 (2.9)	31 (1.1)	510 (3.0)	9.2 (0.05)
Finland	28 (0.9)	546 (3.8)	41 (0.7)	535 (2.8)	31 (0.9)	518 (3.2)	9.2 (0.04)
Croatia	25 (1.6)	534 (2.9)	40 (1.4)	506 (3.1)	35 (1.5)	497 (3.1)	9.1 (0.07)
Korea, Rep. of	22 (0.9)	631 (3.2)	38 (1.1)	607 (3.0)	40 (1.1)	576 (2.9)	8.9 (0.04)
Chinese Taipei	22 (0.9)	624 (3.4)	38 (0.9)	603 (2.8)	41 (1.1)	582 (2.2)	8.9 (0.05)
International Average	45 (0.2)	520 (0.5)	35 (0.1)	491 (0.6)	20 (0.1)	479 (0.7)	

## Primary 4

## Students Like Learning Mathematics Scale



Country	Very Confident in Mathematics		Somewhat Confident in Mathematics		Not Confident in Mathematics		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Montenegro	52 (0.9)	485 (2.2)	35 (0.9)	431 (2.6)	14 (0.5)	394 (4.7)	11.1 (0.04)
Albania	52 (1.4)	524 (3.1)	37 (1.1)	476 (4.0)	12 (0.8)	426 (6.9)	11.0 (0.07)
Kosovo	51 (1.0)	473 (3.1)	38 (1.1)	430 (3.4)	11 (0.7)	381 (7.1)	11.0 (0.04)
North Macedonia	49 (1.5)	513 (5.1)	36 (1.3)	455 (6.0)	15 (0.9)	401 (7.7)	10.9 (0.06)
Cyprus	48 (1.2)	568 (2.7)	37 (0.9)	512 (2.8)	14 (0.8)	468 (4.6)	10.8 (0.06)
Azerbaijan	44 (1.3)	553 (2.8)	41 (1.1)	504 (3.2)	15 (0.8)	480 (3.9)	10.7 (0.05)
Bulgaria	44 (1.2)	553 (3.7)	37 (1.0)	506 (4.0)	19 (1.4)	455 (8.1)	10.5 (0.09)
Saudi Arabia	44 (1.2)	440 (3.6)	39 (0.9)	385 (3.7)	17 (0.8)	342 (6.1)	10.6 (0.05)
Armenia	43 (1.1)	528 (2.9)	40 (0.8)	492 (3.0)	17 (0.7)	459 (4.3)	10.6 (0.05)
Bosnia and Herzegovina	42 (0.9)	486 (2.6)	37 (0.7)	441 (3.0)	21 (0.8)	410 (3.0)	10.5 (0.05)
Bahrain	42 (1.4)	504 (3.1)	40 (1.0)	471 (2.8)	18 (1.0)	446 (3.3)	10.5 (0.07)
Kazakhstan	41 (1.4)	532 (2.8)	47 (1.2)	503 (2.9)	12 (0.7)	487 (4.8)	10.6 (0.06)
Georgia	40 (1.3)	511 (4.0)	44 (1.2)	472 (4.1)	16 (0.9)	431 (6.3)	10.4 (0.06)
Austria	39 (0.9)	573 (2.0)	40 (0.9)	531 (2.4)	20 (0.8)	493 (3.5)	10.3 (0.04)
Netherlands	38 (1.0)	574 (2.7)	41 (1.1)	529 (2.3)	21 (0.9)	488 (2.8)	10.3 (0.05)
Morocco	37 (1.2)	425 (4.3)	48 (1.1)	370 (5.7)	16 (0.8)	336 (6.7)	10.4 (0.05)
Norway (5)	37 (1.1)	581 (3.1)	46 (1.2)	534 (2.6)	18 (0.8)	496 (4.3)	10.3 (0.05)
Sweden	37 (1.3)	551 (3.6)	48 (1.1)	513 (3.2)	15 (0.8)	479 (4.1)	10.2 (0.06)
Hungary	36 (1.0)	571 (2.6)	42 (0.9)	512 (2.9)	22 (0.9)	468 (3.8)	10.2 (0.05)
Oman	36 (1.2)	479 (5.2)	46 (0.9)	418 (4.1)	18 (0.9)	378 (4.2)	10.3 (0.05)
Turkey (5)	34 (1.0)	575 (4.2)	42 (0.7)	513 (4.7)	23 (0.9)	468 (5.9)	10.1 (0.05)
Italy	34 (1.1)	537 (3.4)	46 (1.1)	513 (2.8)	20 (1.0)	483 (3.4)	10.2 (0.05)
Serbia	34 (1.2)	555 (3.4)	45 (1.2)	500 (3.7)	21 (1.2)	450 (4.5)	10.1 (0.07)
Iran, Islamic Rep. of	34 (1.1)	480 (4.7)	46 (1.1)	435 (4.1)	20 (1.2)	406 (6.1)	10.2 (0.06)
Germany	33 (0.9)	565 (2.7)	43 (1.0)	518 (2.4)	23 (1.1)	477 (3.1)	10.0 (0.04)
United Arab Emirates	33 (0.6)	514 (1.9)	44 (0.5)	478 (2.0)	22 (0.5)	448 (2.7)	10.2 (0.03)
Malta	33 (0.7)	547 (2.0)	41 (0.9)	504 (2.1)	26 (0.7)	468 (2.5)	10.0 (0.03)
France	33 (0.9)	524 (3.5)	46 (1.0)	483 (3.5)	21 (0.8)	428 (3.9)	10.0 (0.04)
Ireland	33 (0.7)	585 (3.0)	45 (1.0)	545 (3.0)	22 (0.9)	503 (3.3)	10.0 (0.03)
United States	32 (0.8)	587 (2.6)	42 (0.6)	533 (2.4)	26 (0.7)	482 (3.3)	10.0 (0.04)
Finland	32 (0.9)	573 (2.5)	50 (0.9)	524 (2.7)	17 (0.7)	481 (3.4)	10.1 (0.03)
Canada	32 (0.5)	555 (2.4)	45 (0.6)	506 (2.3)	24 (0.6)	464 (2.2)	10.0 (0.03)
England	31 (1.2)	607 (4.5)	45 (1.0)	549 (3.7)	24 (1.0)	506 (4.2)	9.9 (0.05)
Kuwait	31 (1.5)	432 (5.4)	44 (1.2)	383 (5.4)	25 (1.1)	347 (5.6)	10.0 (0.06)
Slovak Republic	31 (1.1)	550 (3.4)	47 (1.1)	506 (3.7)	22 (0.9)	463 (4.5)	9.9 (0.05)
Belgium (Flemish)	30 (0.7)	573 (2.3)	45 (0.9)	529 (2.3)	25 (0.8)	489 (2.7)	9.9 (0.03)
Croatia	30 (1.4)	550 (2.7)	50 (1.1)	503 (2.6)	20 (1.0)	467 (3.7)	10.0 (0.06)
Lithuania	29 (1.0)	590 (3.6)	51 (1.0)	535 (3.0)	20 (0.9)	492 (4.0)	9.9 (0.04)
Northern Ireland	29 (1.0)	613 (3.8)	45 (1.0)	569 (3.2)	26 (0.8)	510 (3.8)	9.8 (0.04)
Denmark	29 (0.9)	569 (2.8)	49 (1.1)	521 (2.6)	23 (0.8)	478 (2.8)	9.8 (0.03)
Australia	29 (0.8)	568 (3.4)	46 (0.8)	513 (3.2)	25 (0.9)	465 (3.2)	9.9 (0.04)
Qatar	28 (1.2)	491 (4.3)	43 (0.9)	447 (4.4)	28 (0.9)	418 (4.2)	9.9 (0.05)
Spain	27 (0.7)	550 (2.5)	43 (0.7)	502 (2.5)	30 (0.7)	463 (2.8)	9.7 (0.03)
Russian Federation	24 (0.9)	603 (3.4)	46 (1.1)	571 (3.1)	30 (1.1)	533 (4.4)	9.6 (0.04)
Latvia	23 (0.9)	595 (3.0)	45 (0.9)	551 (2.6)	31 (0.9)	503 (3.5)	9.5 (0.04)
Poland	23 (0.8)	571 (3.5)	47 (0.9)	526 (2.7)	30 (1.0)	476 (2.8)	9.5 (0.04)
Czech Republic	23 (1.0)	577 (3.5)	49 (0.8)	539 (2.6)	29 (1.0)	492 (3.2)	9.5 (0.04)
Portugal	22 (0.9)	580 (2.8)	43 (1.0)	532 (3.1)	36 (1.2)	485 (2.7)	9.5 (0.05)
Chile	22 (0.8)	495 (3.3)	46 (0.9)	441 (2.9)	33 (0.9)	411 (3.4)	9.5 (0.04)
Singapore	21 (0.9)	683 (2.9)	42 (0.8)	637 (3.9)	37 (1.2)	579 (3.4)	9.3 (0.05)
New Zealand	20 (0.6)	546 (3.6)	49 (0.9)	492 (2.6)	31 (0.9)	446 (3.2)	9.4 (0.03)
Hong Kong SAR	18 (0.8)	652 (4.2)	43 (1.1)	606 (3.6)	39 (1.2)	573 (3.7)	9.2 (0.05)
Pakistan	18 (3.1)	374 (19.2)	56 (2.2)	328 (10.5)	26 (2.3)	302 (12.6)	9.7 (0.17)
South Africa (5)	17 (0.7)	456 (4.9)	53 (0.5)	371 (3.6)	31 (0.9)	340 (3.7)	9.4 (0.03)
Japan	16 (0.6)	646 (3.3)	53 (0.9)	601 (2.0)	32 (0.9)	554 (2.3)	9.2 (0.03)
Chinese Taipei	15 (0.7)	650 (3.5)	41 (1.0)	610 (2.6)	44 (1.0)	572 (2.4)	9.0 (0.03)
Korea, Rep. of	15 (0.7)	651 (2.6)	49 (1.1)	614 (2.5)	36 (0.9)	559 (2.7)	9.2 (0.03)
Philippines	8 (0.7)	403 (9.9)	56 (1.0)	306 (6.0)	36 (1.2)	269 (6.7)	9.0 (0.04)
International Average	32 (0.1)	545 (0.6)	44 (0.1)	497 (0.5)	23 (0.1)	456 (0.6)	

## Primary 4

## Students Confident in Mathematics Scale



# Attitudinal Results (Secondary 2)

Secondary 2	Students Very Much Like Learning Mathematics	Students Somewhat Like Learning Mathematics	Students Do Not Like Learning Mathematics
HKSAR % (Scale Avg.)	13% (622)	39% (595)	48% (554)
Int'l % (Scale Avg.)	20% (530)	39% (496)	41% (468)

Secondary 2	Students Very Confident in Mathematics	Students Somewhat Confident in Mathematics	Students Not Confident in Mathematics
HKSAR % (Scale Avg.)	9% (646)	37% (600)	54% (554)
Int'l % (Scale Avg.)	15% (562)	42% (502)	44% (456)



Country	Very Much Like Learning Mathematics		Somewhat Like Learning Mathematics		Do Not Like Learning Mathematics		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Egypt	42 (1.3)	437 (5.4)	41 (0.9)	396 (5.6)	17 (0.9)	405 (6.4)	11.1 (0.06)
Morocco	38 (1.1)	409 (3.0)	40 (0.7)	380 (2.9)	22 (0.9)	368 (2.7)	10.8 (0.05)
Jordan	37 (1.3)	441 (4.2)	39 (0.8)	413 (4.8)	24 (1.0)	408 (5.6)	10.8 (0.06)
South Africa (9)	36 (0.7)	403 (2.5)	44 (0.5)	382 (2.6)	19 (0.5)	385 (3.0)	10.8 (0.03)
Iran, Islamic Rep. of	34 (0.9)	478 (5.1)	39 (0.8)	438 (4.6)	27 (1.1)	418 (4.5)	10.6 (0.05)
Oman	31 (0.9)	455 (3.4)	46 (0.7)	396 (3.0)	23 (1.0)	390 (4.1)	10.6 (0.04)
Turkey	29 (1.0)	539 (5.8)	41 (0.8)	485 (4.9)	30 (1.1)	470 (4.8)	10.3 (0.05)
Lebanon	28 (1.3)	456 (3.6)	44 (1.1)	425 (3.9)	28 (1.1)	413 (3.7)	10.4 (0.06)
Saudi Arabia	27 (1.1)	413 (4.0)	36 (0.7)	391 (3.2)	37 (1.0)	386 (3.0)	10.1 (0.05)
Kazakhstan	26 (1.2)	509 (4.9)	54 (1.1)	484 (4.0)	20 (1.1)	472 (5.0)	10.6 (0.05)
United Arab Emirates	26 (0.6)	512 (3.0)	41 (0.6)	471 (2.4)	33 (0.6)	451 (1.9)	10.2 (0.03)
Georgia	25 (1.4)	493 (6.1)	43 (1.1)	461 (4.9)	32 (1.3)	438 (5.3)	10.2 (0.06)
Bahrain	24 (0.8)	510 (3.4)	36 (0.8)	483 (2.4)	40 (1.2)	462 (2.9)	9.9 (0.06)
Singapore	22 (0.7)	653 (4.0)	43 (0.7)	624 (3.9)	35 (0.8)	582 (5.0)	10.1 (0.03)
Malaysia	20 (0.8)	498 (5.2)	57 (0.8)	455 (3.3)	23 (1.0)	442 (4.2)	10.3 (0.04)
Kuwait	20 (0.9)	429 (7.0)	34 (1.0)	406 (6.3)	45 (1.3)	392 (4.4)	9.7 (0.05)
Israel	19 (1.0)	544 (6.3)	36 (1.0)	527 (5.3)	45 (1.4)	505 (4.1)	9.6 (0.06)
Cyprus	19 (0.8)	549 (3.8)	35 (0.8)	513 (2.8)	46 (1.0)	473 (2.4)	9.6 (0.04)
Portugal	19 (0.9)	548 (4.7)	34 (1.0)	508 (3.9)	48 (1.3)	477 (3.3)	9.6 (0.06)
Russian Federation	17 (0.7)	583 (6.3)	46 (0.9)	549 (4.7)	37 (1.1)	519 (5.0)	9.9 (0.04)
United States	17 (0.8)	561 (6.2)	37 (0.6)	528 (5.0)	45 (1.0)	493 (4.7)	9.6 (0.05)
Italy	16 (0.9)	537 (4.3)	34 (1.1)	513 (3.3)	49 (1.3)	474 (2.9)	9.4 (0.06)
Romania	16 (1.0)	537 (6.0)	39 (1.1)	486 (5.6)	44 (1.6)	454 (4.8)	9.7 (0.06)
Qatar	16 (0.8)	486 (5.6)	39 (1.1)	449 (5.9)	45 (1.4)	424 (3.5)	9.6 (0.06)
Ireland	14 (0.7)	567 (4.4)	35 (1.1)	537 (3.1)	50 (1.3)	504 (2.7)	9.4 (0.05)
Chile	14 (0.7)	468 (5.7)	40 (1.2)	449 (3.4)	46 (1.5)	426 (2.9)	9.6 (0.05)
New Zealand	14 (0.6)	528 (5.4)	39 (1.1)	495 (4.1)	47 (1.2)	460 (3.6)	9.5 (0.04)
Australia	13 (0.7)	576 (5.1)	37 (0.8)	536 (4.5)	50 (1.2)	489 (3.4)	9.4 (0.05)
Hong Kong SAR	13 (0.7)	622 (5.8)	39 (1.0)	595 (4.9)	48 (1.4)	554 (4.4)	9.4 (0.05)
Sweden	13 (0.7)	545 (4.7)	34 (0.9)	522 (3.4)	53 (1.2)	482 (2.5)	9.3 (0.05)
England	12 (0.8)	552 (8.5)	38 (1.1)	530 (6.6)	50 (1.2)	500 (5.0)	9.4 (0.04)
Norway (9)	12 (0.8)	558 (4.8)	34 (0.9)	524 (2.5)	54 (1.1)	479 (2.7)	9.2 (0.04)
Lithuania	12 (0.8)	563 (6.3)	43 (1.2)	531 (3.7)	44 (1.3)	500 (3.0)	9.6 (0.04)
Chinese Taipei	12 (0.6)	685 (5.2)	33 (0.7)	643 (3.0)	56 (0.9)	579 (2.7)	9.2 (0.04)
France	11 (0.7)	524 (4.8)	43 (1.2)	498 (3.1)	46 (1.3)	459 (2.5)	9.5 (0.04)
Hungary	11 (0.6)	590 (7.0)	32 (0.9)	538 (4.2)	57 (1.1)	491 (2.9)	9.2 (0.04)
Japan	10 (0.6)	658 (5.3)	34 (0.9)	618 (3.2)	56 (1.1)	569 (2.8)	9.3 (0.04)
Finland	9 (0.6)	572 (4.3)	34 (1.0)	533 (3.3)	57 (1.2)	485 (2.3)	9.1 (0.05)
Korea, Rep. of	8 (0.5)	685 (5.3)	32 (0.9)	638 (3.8)	61 (0.9)	581 (2.8)	9.0 (0.03)
International Average	20 (0.1)	530 (0.8)	39 (0.1)	496 (0.7)	41 (0.2)	468 (0.6)	

## Secondary 2

## Students Like Learning Mathematics Scale



Faculty of Education  
The University of Hong Kong  
香港大學教育學院



Policy<sup>21</sup>  
政策二十一 91



Country	Very Confident in Mathematics		Somewhat Confident in Mathematics		Not Confident in Mathematics		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Israel	25 (1.1)	582 (5.4)	43 (0.9)	515 (4.4)	32 (1.2)	482 (4.1)	10.7 (0.07)
Egypt	23 (1.0)	459 (4.8)	49 (0.8)	413 (5.6)	28 (1.0)	385 (5.8)	10.8 (0.05)
Norway (9)	21 (0.8)	580 (2.9)	39 (1.1)	513 (2.8)	40 (1.0)	456 (2.7)	10.3 (0.05)
Lebanon	21 (1.0)	479 (4.2)	45 (1.1)	429 (3.0)	34 (1.3)	405 (4.0)	10.5 (0.06)
Cyprus	20 (0.7)	569 (3.1)	37 (0.9)	513 (2.8)	43 (0.9)	460 (3.0)	10.1 (0.04)
Jordan	20 (1.0)	478 (4.1)	47 (0.7)	420 (4.2)	32 (1.1)	392 (5.0)	10.6 (0.05)
United States	20 (0.8)	578 (5.0)	40 (0.7)	537 (4.5)	40 (1.0)	471 (4.2)	10.3 (0.05)
Iran, Islamic Rep. of	20 (0.7)	517 (5.9)	43 (1.0)	447 (4.6)	37 (1.0)	408 (3.8)	10.4 (0.04)
Bahrain	20 (0.7)	533 (3.6)	44 (0.8)	482 (2.5)	36 (0.9)	452 (2.8)	10.4 (0.04)
Saudi Arabia	19 (0.8)	444 (4.0)	49 (0.7)	395 (3.1)	32 (0.9)	366 (2.6)	10.5 (0.05)
United Arab Emirates	18 (0.5)	536 (2.9)	45 (0.4)	478 (2.2)	37 (0.4)	442 (2.3)	10.4 (0.02)
Italy	18 (0.7)	554 (3.9)	37 (1.0)	514 (2.9)	45 (1.2)	462 (2.9)	9.9 (0.06)
Oman	17 (0.7)	486 (4.5)	50 (0.8)	411 (3.2)	33 (0.8)	380 (2.9)	10.5 (0.04)
Hungary	16 (0.6)	609 (4.1)	39 (0.8)	530 (3.5)	45 (1.0)	471 (3.1)	10.0 (0.05)
Sweden	16 (0.8)	578 (3.1)	43 (0.9)	516 (2.8)	41 (1.1)	461 (2.9)	10.1 (0.05)
Turkey	15 (0.7)	600 (5.6)	35 (0.9)	513 (5.2)	50 (1.0)	453 (4.0)	9.8 (0.05)
Georgia	15 (0.9)	537 (6.1)	44 (1.2)	473 (4.3)	41 (1.4)	422 (4.8)	10.2 (0.06)
Ireland	15 (0.7)	584 (3.6)	44 (1.1)	533 (3.1)	41 (1.3)	495 (2.2)	10.0 (0.05)
Finland	15 (0.7)	586 (3.3)	40 (0.7)	523 (2.9)	45 (1.0)	473 (2.4)	10.0 (0.04)
Morocco	15 (0.6)	440 (3.6)	47 (0.6)	390 (2.6)	39 (0.9)	368 (2.1)	10.2 (0.04)
England	14 (0.9)	588 (6.6)	49 (1.0)	528 (5.7)	38 (1.3)	480 (5.2)	10.1 (0.05)
Australia	14 (0.6)	594 (5.1)	42 (0.8)	540 (4.3)	44 (1.0)	474 (3.3)	9.9 (0.05)
France	13 (0.7)	556 (3.8)	42 (0.9)	498 (3.0)	45 (1.1)	446 (2.4)	9.8 (0.05)
Lithuania	13 (0.7)	604 (4.1)	42 (0.9)	535 (4.1)	45 (1.2)	484 (2.9)	9.9 (0.05)
Qatar	13 (0.9)	516 (7.5)	44 (1.1)	455 (4.5)	43 (1.2)	413 (3.9)	10.0 (0.06)
Kazakhstan	13 (0.7)	539 (4.5)	54 (1.2)	494 (3.7)	34 (1.3)	459 (3.6)	10.3 (0.05)
Singapore	12 (0.5)	679 (3.5)	40 (0.8)	637 (3.6)	48 (0.9)	582 (5.0)	9.7 (0.04)
Kuwait	12 (0.6)	466 (7.6)	43 (0.8)	408 (5.5)	45 (0.9)	385 (4.5)	9.9 (0.04)
Russian Federation	12 (0.7)	609 (5.3)	44 (0.9)	563 (4.3)	45 (0.9)	508 (5.1)	9.9 (0.04)
Portugal	11 (0.7)	580 (5.6)	34 (1.1)	525 (3.3)	55 (1.2)	469 (3.4)	9.5 (0.05)
Romania	10 (0.7)	579 (5.9)	31 (1.0)	510 (5.6)	58 (1.2)	446 (4.2)	9.4 (0.05)
New Zealand	10 (0.6)	569 (4.6)	44 (0.9)	502 (3.8)	45 (0.7)	445 (3.6)	9.8 (0.04)
Chile	10 (0.6)	509 (5.1)	41 (1.1)	452 (3.2)	49 (1.3)	418 (2.9)	9.7 (0.04)
Chinese Taipei	9 (0.4)	706 (5.4)	31 (0.7)	656 (3.2)	59 (0.8)	575 (2.6)	9.2 (0.04)
Hong Kong SAR	9 (0.7)	646 (7.3)	37 (1.0)	600 (4.5)	54 (1.1)	554 (4.3)	9.4 (0.05)
Korea, Rep. of	8 (0.5)	695 (4.8)	38 (0.8)	644 (3.8)	54 (0.9)	567 (2.7)	9.5 (0.03)
South Africa (9)	7 (0.3)	468 (4.2)	40 (0.5)	396 (2.6)	53 (0.6)	376 (2.1)	9.6 (0.02)
Japan	6 (0.4)	688 (5.8)	33 (0.8)	629 (3.1)	61 (0.9)	567 (2.9)	9.1 (0.04)
Malaysia	3 (0.3)	584 (10.5)	33 (0.8)	478 (4.6)	64 (0.9)	448 (2.7)	9.2 (0.03)
International Average	15 (0.1)	562 (0.8)	42 (0.1)	502 (0.6)	44 (0.2)	456 (0.6)	

## Secondary 2

## Students Confident in Mathematics Scale



# Attitudinal Results (Secondary 2)

	Students Strongly Value Mathematics	Students Somewhat Value Mathematics	Students Do Not Value Mathematics
<b>Secondary 2</b>			
HKSAR % (Scale Avg.)	18% (605)	54% (586)	28% (547)
Int'l % (Scale Avg.)	37% (507)	47% (487)	16% (462)





Country	Strongly Value Mathematics		Somewhat Value Mathematics		Do Not Value Mathematics		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
South Africa (9)	68 (0.6)	399 (2.2)	27 (0.6)	377 (2.7)	5 (0.2)	357 (4.1)	10.9 (0.03)
Egypt	63 (1.2)	425 (5.3)	31 (0.9)	403 (5.5)	6 (0.5)	381 (9.3)	10.9 (0.06)
Jordan	62 (1.2)	433 (3.6)	31 (1.0)	411 (5.4)	7 (0.5)	384 (8.8)	10.8 (0.05)
Morocco	60 (0.9)	400 (2.7)	32 (0.7)	374 (2.4)	8 (0.4)	368 (3.8)	10.7 (0.04)
Israel	54 (1.2)	529 (4.9)	37 (1.0)	514 (4.6)	9 (0.5)	501 (6.5)	10.4 (0.05)
Oman	53 (0.9)	432 (3.0)	39 (0.8)	397 (3.5)	8 (0.4)	375 (5.8)	10.3 (0.04)
Iran, Islamic Rep. of	49 (1.2)	457 (4.4)	40 (1.0)	440 (3.9)	11 (0.6)	426 (6.2)	10.2 (0.05)
Turkey	48 (1.2)	520 (4.9)	40 (0.8)	480 (4.7)	12 (0.8)	454 (6.4)	10.1 (0.06)
Georgia	47 (1.3)	474 (4.8)	43 (1.2)	455 (4.8)	10 (0.8)	436 (9.3)	10.1 (0.06)
United Arab Emirates	47 (0.6)	492 (2.7)	41 (0.6)	468 (1.8)	12 (0.3)	431 (3.4)	10.1 (0.03)
Saudi Arabia	46 (1.1)	403 (3.3)	42 (0.8)	391 (2.7)	12 (0.6)	380 (4.5)	10.1 (0.05)
Lebanon	45 (1.3)	447 (3.0)	43 (1.0)	422 (4.0)	12 (0.8)	409 (5.5)	10.0 (0.06)
Kuwait	41 (1.2)	416 (5.8)	43 (0.9)	401 (5.0)	16 (0.7)	384 (5.8)	9.7 (0.05)
Bahrain	40 (0.9)	493 (2.6)	44 (0.6)	479 (2.4)	16 (0.8)	459 (3.2)	9.7 (0.04)
United States	40 (0.8)	532 (5.0)	48 (0.7)	516 (4.7)	12 (0.5)	484 (6.1)	9.8 (0.04)
Qatar	38 (1.1)	456 (5.7)	44 (1.1)	449 (4.5)	18 (1.1)	409 (4.8)	9.6 (0.06)
Australia	38 (0.9)	539 (4.5)	48 (0.8)	514 (3.8)	14 (0.6)	479 (4.8)	9.7 (0.04)
England	38 (1.2)	528 (6.1)	51 (0.9)	515 (5.6)	10 (0.7)	500 (7.3)	9.8 (0.05)
New Zealand	37 (1.0)	494 (4.2)	50 (0.9)	481 (3.6)	14 (0.7)	461 (5.1)	9.6 (0.05)
Cyprus	37 (1.0)	523 (2.8)	46 (0.9)	499 (2.2)	17 (0.7)	467 (3.9)	9.6 (0.04)
Ireland	35 (1.0)	538 (3.5)	49 (0.9)	525 (2.6)	16 (0.7)	496 (4.3)	9.5 (0.04)
Chile	35 (1.0)	446 (3.5)	53 (1.0)	442 (3.1)	12 (0.6)	425 (5.2)	9.7 (0.04)
Romania	35 (1.3)	502 (5.6)	43 (1.0)	472 (4.8)	22 (1.3)	461 (4.9)	9.4 (0.07)
Norway (9)	35 (1.0)	524 (3.4)	51 (0.9)	503 (2.4)	15 (0.7)	467 (4.4)	9.6 (0.05)
Malaysia	34 (1.0)	486 (3.3)	56 (0.9)	453 (3.7)	10 (0.8)	421 (5.6)	9.6 (0.04)
Portugal	34 (1.1)	525 (4.8)	48 (1.3)	493 (3.1)	17 (1.0)	473 (4.0)	9.5 (0.05)
Singapore	34 (0.8)	628 (4.8)	56 (0.8)	614 (4.1)	10 (0.4)	584 (6.3)	9.6 (0.03)
Kazakhstan	31 (1.0)	493 (4.6)	53 (0.9)	487 (3.6)	15 (0.8)	482 (5.1)	9.5 (0.05)
France	27 (0.9)	493 (3.8)	57 (1.0)	485 (2.7)	16 (0.7)	458 (3.8)	9.3 (0.04)
Russian Federation	26 (1.0)	560 (6.1)	53 (0.9)	543 (4.5)	21 (1.0)	526 (5.0)	9.2 (0.05)
Lithuania	26 (1.2)	533 (4.7)	56 (1.1)	520 (3.2)	19 (0.9)	508 (4.3)	9.2 (0.04)
Hungary	25 (0.9)	543 (5.5)	53 (0.9)	516 (3.4)	22 (0.8)	489 (3.8)	9.1 (0.04)
Italy	25 (0.8)	511 (4.0)	54 (0.9)	498 (2.9)	21 (0.8)	482 (3.6)	9.1 (0.04)
Finland	24 (0.9)	535 (3.3)	54 (0.8)	513 (2.5)	22 (0.9)	473 (3.7)	9.0 (0.04)
Sweden	24 (0.9)	515 (4.1)	58 (0.8)	505 (2.7)	18 (0.7)	487 (3.5)	9.2 (0.04)
Hong Kong SAR	18 (1.0)	605 (6.3)	54 (1.0)	586 (4.3)	28 (0.9)	547 (5.2)	8.7 (0.05)
Korea, Rep. of	14 (0.6)	668 (5.0)	56 (0.9)	620 (2.9)	30 (1.1)	554 (3.1)	8.5 (0.04)
Japan	14 (0.7)	629 (5.7)	59 (0.8)	598 (2.7)	27 (0.8)	568 (3.7)	8.6 (0.03)
Chinese Taipei	12 (0.5)	659 (5.8)	48 (0.8)	634 (3.1)	40 (1.0)	573 (3.0)	8.2 (0.04)
International Average	37 (0.2)	507 (0.7)	47 (0.1)	487 (0.6)	16 (0.1)	462 (0.8)	

**Secondary 2**

**Students Value Mathematics Scale**





# Trends in Attitudinal Results

Students Like Learning Mathematics – Primary 4 / Secondary 2				
	Very Much Like Learning Mathematics			
	Percentage of Primary 4 Students		Percentage of Secondary 2 Students	
	Hong Kong	International	Hong Kong	International
2019	30 (1.3)	45 (0.2)	13 (0.7)	20 (0.1)
2015	35 <sup>^</sup> (1.1)	46 <sup>^</sup> (0.2)	15 <sup>^</sup> (0.6)	22 <sup>^</sup> (0.1)
2011	47 <sup>^</sup> (1.0)	48 <sup>^</sup> (0.2)	19 <sup>^</sup> (0.8)	26 <sup>^</sup> (0.2)

<sup>^</sup> Result significantly higher than 2019

Students Confident in Mathematics – Primary 4 / Secondary 2				
	Very Confident in Mathematics			
	Percentage of Primary 4 Students		Percentage of Secondary 2 Students	
	Hong Kong	International	Hong Kong	International
2019	18 (0.8)	32 (0.1)	9 (0.7)	15 (0.1)
2015	19 (0.8)	32 (0.1)	10 (0.5)	14 <sup>#</sup> (0.1)
2011	24 <sup>^</sup> (0.9)	34 <sup>^</sup> (0.1)	7 <sup>#</sup> (0.4)	14 <sup>#</sup> (0.1)

<sup>^</sup> Result significantly higher than 2019

<sup>#</sup> Result significantly lower than 2019



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# Trends in Attitudinal Results

Students Value Mathematics – Secondary 2		
	Strongly Value Mathematics	
	Percentage of Secondary 2 Students	
	Hong Kong	International
2019	18 (1.0)	37 (0.2)
2015	19 (0.8)	42^ (0.2)
2011	26^ (0.8)	46^ (0.2)

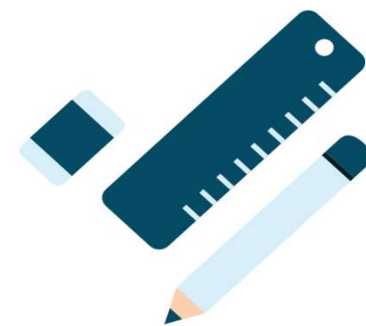
^ Result significantly higher than 2019



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# HOME RESOURCES



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# Home Resources for Learning (Primary 4)

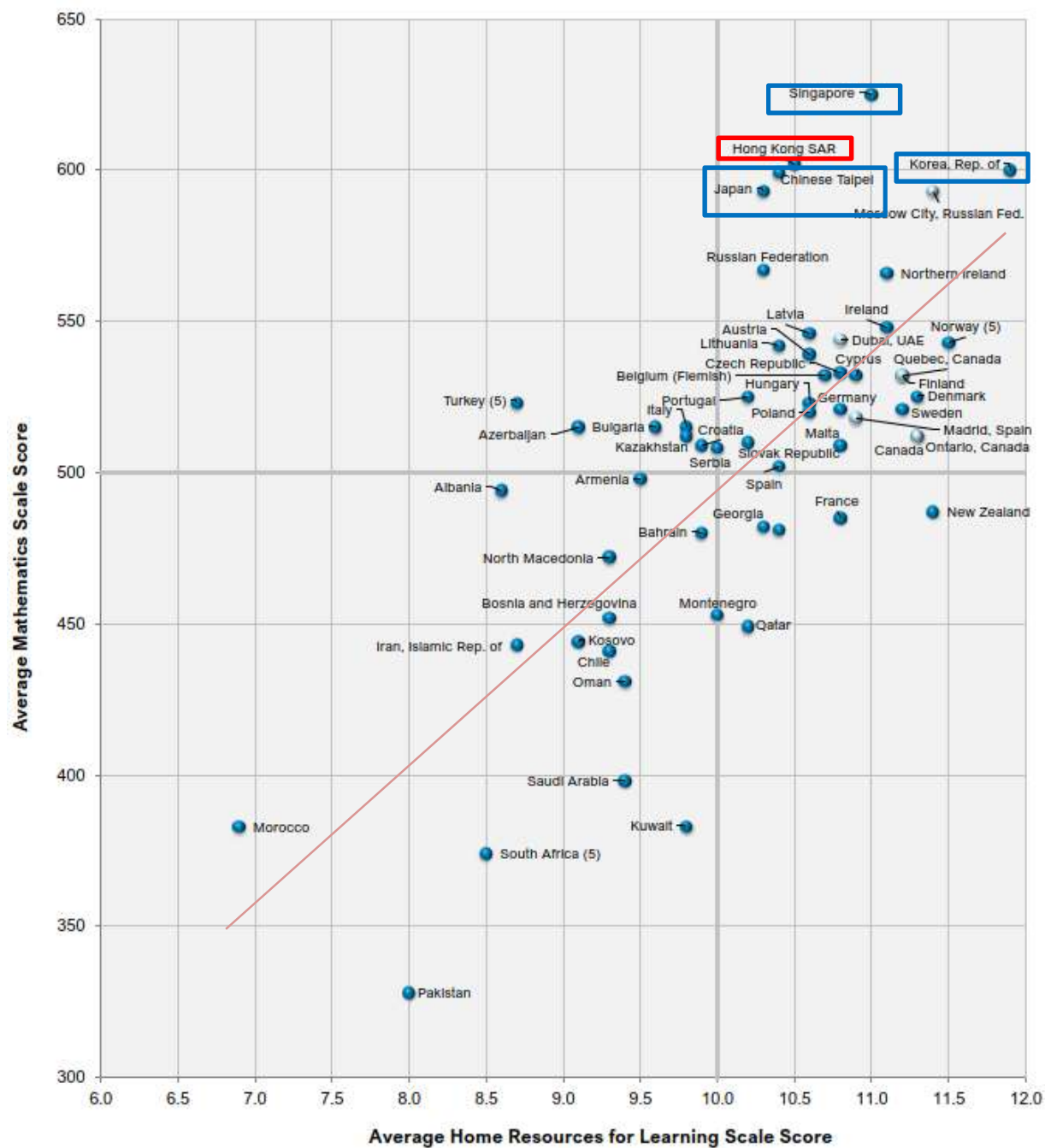
	Many Resources	Some Resources	Few Resources
<b>Primary 4</b>			
HKSAR % (Scale Avg.)	27% (636)	67% (595)	6% (561)
Int'l % (Scale Avg.)	17% (562)	75% (498)	8% (433)



## Primary 4

# Home Resources for Learning

Average Mathematics Achievement by Home Resources for Learning



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# Home Educational Resources (Secondary 2)

	Many Resources	Some Resources	Few Resources
<b>Secondary 2</b>			
HKSAR % (Scale Avg.)	13% (625)	74% (577)	13% (540)
Int'l % (Scale Avg.)	14% (546)	73% (488)	13% (433)



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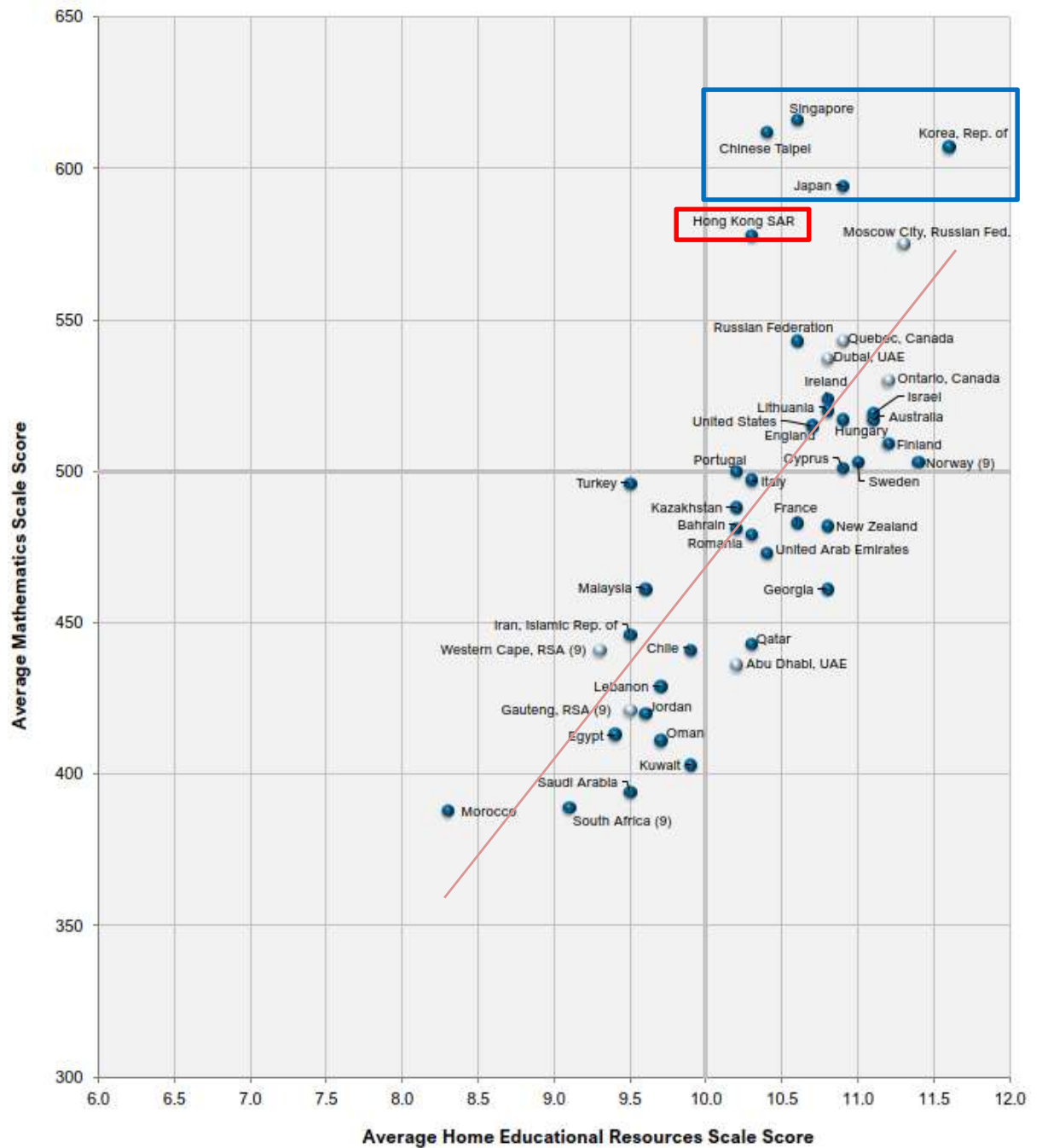


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## Secondary 2

## Home Educational Resources

Average Mathematics Achievement by Home Educational Resources





# Some Observations for Mathematics



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# Observations for Mathematics

- ❖ Students in Hong Kong continue to do well in mathematics in TIMSS 2019
- ❖ Apart from the difference in performance from the TIMSS 2015 cycle, the mathematics achievement of P4 & S2 students in Hong Kong remain fairly consistent
- ❖ About 1/3 of our students (P4: 38%, S2: 31%) have reached the advanced int'l benchmark of mathematics
- ❖ At least 96% of our students have reached the lowest international benchmark of mathematics (nearly 100% of our P4 students have passed this benchmark)  
→ Good at maintaining the basic competency



# Observations for Mathematics

- ❖ What could be the reason for the drop in mathematics achievement in TIMSS 2019 apart from the change in testing mode?

→ Fewer multiple-choice/selected-response (MC) items and more constructed-response (CR) items?

P4: T19\*: 46% (MC) / 54% (CR)

T15: 52.5% (MC) / 47.5% (CR)

T11: 52.8% (MC) / 47.2% (CR)

S2: T19\*: 48% (MC) / 52% (CR)

T15: 54.7% (MC) / 45.3% (CR)

T11: 53.9% (MC) / 46.1% (CR)

(\*Provisional)



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# Observations for Mathematics

- ❖ What could be the cause of the drop in mathematics achievement in TIMSS 2019 apart from the change in testing mode?

→ Decrease in instructional hours for mathematics?

P4: T19: 152 hours (14.9% of total instructional hrs)

T15: 159 hours (15.9% of total instructional hrs)

T11: 158 hours (14.9% of total instructional hrs)

S2: T19: 143 hours (14.3% of total instructional hrs)

T15: 139 hours (14.0% of total instructional hrs)

T11: 138 hours (13.5% of total instructional hrs)



# Mode Effect

1. Comparisons between eTIMSS & Bridge Study
2. Comparisons between TIMSS 2015 & Bridge Study
3. Comparisons between Previous Cycles of TIMSS & Bridge Study



# Comparisons between eTIMSS & Bridge Study (Primary 4)

eTIMSS 2019 vs Bridge 2019 (Primary 4)								
	eTIMSS		eTIMSS		Bridge		Bridge	
	Percentage of students	s.e.	Scale scores	s.e.	Percentage of students	s.e.	Scale scores	s.e.
1 Mathematics			601.62	3.31			607.21	7.87
Science			531.25	3.35			542.34	7.29
2 Math_Female	48.58	1.40	598.52	3.55	46.04	1.35	598.62	7.56
Math_Male	51.42	1.40	604.34	3.86	53.96	1.35	615.34^	8.91
Science_Female	48.58	1.40	531.19	3.11	46.04	1.35	542.11	6.96
Science_Male	51.42	1.40	531.34	4.31	53.96	1.35	542.57	8.32
3 Math_Advanced	37.85	1.95			41.99	4.75		
Math_High	40.64	1.07			36.23	3.05		
Math_Intermediate	17.06	1.26			16.90	2.74		
Math_Low	4.13	0.61			4.38	1.01		
Science_Advanced	8.48	0.94			13.78^	2.25		
Science_High	32.47	1.62			35.55	2.82		
Science_Intermediate	38.34^	1.26			32.23	1.89		
Science_Low	16.77	1.36			13.93	2.12		

^ Result significantly higher

Result significant between studies

Result significant within the study



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# Comparisons between eTIMSS & Bridge Study (Secondary 2)

eTIMSS 2019 vs Bridge 2019 (Secondary 2)								
	eTIMSS		eTIMSS		Bridge		Bridge	
	Percentage of students	s.e.	Scale scores	s.e.	Percentage of students	s.e.	Scale scores	s.e.
1 Mathematics			578.31	4.06			581.13	6.86
Science			503.51	5.21			530.58^	5.28
2 Math_Female	46.31	2.10	582.21	4.92	44.09	3.30	577.10	6.09
Math_Male	53.69	2.10	574.95	5.41	55.91	3.30	584.73	10.15
Science_Female	46.31	2.10	504.66	5.85	44.09	3.30	525.50^	6.00
Science_Male	53.69	2.10	502.53	6.35	55.91	3.30	535.18^	8.95
3 Math_Advanced	31.89	1.92			32.92	3.60		
Math_High	34.14	1.91			33.81	2.46		
Math_Intermediate	20.68	1.35			21.79	2.49		
Math_Low	9.13	0.89			8.43	1.42		
Science_Advanced	9.42	1.17			11.16	1.39		
Science_High	23.85	1.45			31.94^	2.56		
Science_Intermediate	30.28	1.44			33.87	2.40		
Science_Low	21.52^	1.45			16.45	1.77		

^ Result significantly higher

Result significant between studies



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# Comparisons between eTIMSS & Bridge Study (East Asian Regions)

eTIMSS 2019 vs Bridge 2019 (Primary 4)					
Mathematics	eTIMSS		Bridge		Significant?
	Scale scores	s.e.	Scale scores	s.e.	
1 Chinese Taipei	599	1.9	603	2.6	n.s.
2 Hong Kong SAR	602	3.3	607	7.9	n.s.
3 Korea	600	2.2	595	2.5	n.s.
4 Singapore	625	3.9	631	5.6	n.s.
International Avg.	528	0.6	529	1.0	n.s.

eTIMSS 2019 vs Bridge 2019 (Primary 4)					
Science	eTIMSS		Bridge		Significant?
	Scale scores	s.e.	Scale scores	s.e.	
1 Chinese Taipei	558	1.8	554	2.9	n.s.
2 Hong Kong SAR	531	3.3	542	7.3	n.s.
3 Korea	588	2.1	588	2.6	n.s.
4 Singapore	595	3.4	599	5.1	n.s.
International Avg.	523	1.0	522	1.2	n.s.





# Comparisons between eTIMSS & Bridge Study (East Asian Regions)

eTIMSS 2019 vs Bridge 2019 (Secondary 2)					
Mathematics	eTIMSS		Bridge		Significant?
	Scale scores	s.e.	Scale scores	s.e.	
1 Chinese Taipei	612	2.7	618	5.4	n.s.
2 Hong Kong SAR	578	4.1	581	6.9	n.s.
3 Korea	607	2.8	613	3.6	n.s.
4 Singapore	616	4.0	630 <sup>^</sup>	6.5	Sign.*(0.05)
International Avg.	517	0.8	519	1.5	n.s.

eTIMSS 2019 vs Bridge 2019 (Secondary 2)					
Science	eTIMSS		Bridge		Significant?
	Scale scores	s.e.	Scale scores	s.e.	
1 Chinese Taipei	574	1.9	584	5.0	n.s.
2 Hong Kong SAR	504	5.2	531 <sup>^</sup>	5.3	Sign.*** (0.001)
3 Korea	561	2.1	563	3.6	n.s.
4 Singapore	608	3.9	611	6.1	n.s.
International Avg.	513	0.8	516	1.6	n.s.

<sup>^</sup> Result significantly higher

  Result significant between studies



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# Comparisons between TIMSS 2015 & Bridge Study (Primary 4)

TIMSS 2015 vs Bridge 2019 (Primary 4)								
	TIMSS 2015		TIMSS 2015		Bridge		Bridge	
	Percentage of students	s.e.	Scale scores	s.e.	Percentage of students	s.e.	Scale scores	s.e.
1 Mathematics			614.52	2.87			607.21	7.87
Science			556.55	2.93			542.34	7.29
2 Math_Female	45.75	1.47	609.02	3.83	46.04	1.35	598.62	7.56
Math_Male	54.25	1.47	619.16^	2.85	53.96	1.35	615.34^	8.91
Science_Female	45.75	1.47	551.31	3.87	46.04	1.35	542.11	6.96
Science_Male	54.25	1.47	560.96^	3.27	53.96	1.35	542.57	8.32
3 Math_Advanced	44.81	1.99			41.99	4.75		
Math_High	39.50	1.52			36.23	3.05		
Math_Intermediate	13.49	1.10			16.90	2.74		
Math_Low	1.98	0.41			4.38^	1.01		
Science_Advanced	16.16	1.25			13.78	2.25		
Science_High	39.27	1.26			35.55	2.82		
Science_Intermediate	32.36	1.36			32.23	1.89		
Science_Low	10.30	0.93			13.93	2.12		

^ Result significantly higher

Result significant between studies

Result significant within the study



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# Comparisons between TIMSS 2015 & Bridge Study (Secondary 2)

TIMSS 2015 vs Bridge 2019 (Secondary 2)								
	TIMSS 2015		TIMSS 2015		Bridge		Bridge	
	Percentage of students	s.e.	Scale scores	s.e.	Percentage of students	s.e.	Scale scores	s.e.
1 Mathematics			594.25	4.62			581.13	6.86
Science			545.76^	3.92			530.58	5.28
2 Math_Female	47.49	2.08	591.47	4.70	44.09	3.30	577.10	6.09
Math_Male	52.51	2.08	596.77	5.99	55.91	3.30	584.73	10.15
Science_Female	47.49	2.08	540.44^	4.18	44.09	3.30	525.50	6.00
Science_Male	52.51	2.08	550.57^	4.86	55.91	3.30	535.18	8.95
3 Math_Advanced	36.89	2.26			32.92	3.60		
Math_High	38.14	1.32			33.81	2.46		
Math_Intermediate	17.04	1.15			21.79	2.49		
Math_Low	5.90	0.95			8.43	1.42		
Science_Advanced	11.54	1.26			11.16	1.39		
Science_High	39.68^	1.27			31.94	2.56		
Science_Intermediate	33.90	1.45			33.87	2.40		
Science_Low	11.28	0.98			16.45^	1.77		

^ Result significantly higher

Result significant between studies

Result significant within the study



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# Comparisons between Previous Cycles of TIMSS & Bridge Study

Bridge 2019 vs. Previous TIMSS Cycles				
	Mathematics (Primary 4)		Mathematics (Secondary 2)	
	Scale scores	s.e.	Scale scores	s.e.
(2019 eTIMSS)	(602)	(3.3)	(578)	(4.1)
<b>2019 Bridge Study</b>	<b>607</b>	<b>7.9</b>	<b>581</b>	<b>6.9</b>
<b>2015</b>	<b>615</b>	<b>2.9</b>	<b>594</b>	<b>4.6</b>
<b>2011</b>	<b>602</b>	<b>3.4</b>	<b>586</b>	<b>3.9</b>
<b>2007</b>	<b>607</b>	<b>3.5</b>	<b>572</b>	<b>5.9</b>
<b>2003</b>	<b>575<sup>^</sup></b>	<b>3.1</b>	<b>586</b>	<b>3.4</b>
<b>1999</b>	<b>N/A</b>	<b>N/A</b>	<b>582</b>	<b>4.3</b>
<b>1995</b>	<b>557<sup>^</sup></b>	<b>4.0</b>	<b>569</b>	<b>6.1</b>

<sup>^</sup> TIMSS 2019 Bridge result significantly higher



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# Comparisons between Previous Cycles of TIMSS & Bridge Study

Bridge 2019 vs. Previous TIMSS Cycles				
	Science (Primary 4)		Science (Secondary 2)	
	Scale scores	s.e.	Scale scores	s.e.
(2019 eTIMSS)	(531)	(3.4)	(504)	(5.2)
2019 Bridge Study	542	7.3	531	5.3
2015	557	2.9	546 <sup>#</sup>	3.9
2011	535	3.7	535	3.4
2007	554	3.5	530	5.0
2003	542	3.0	556 <sup>#</sup>	3.0
1999	N/A	N/A	530	3.5
1995	508 <sup>^</sup>	3.4	510 <sup>^</sup>	5.9

<sup>^</sup> TIMSS 2019 Bridge result significantly higher

<sup>#</sup> TIMSS 2019 Bridge result significantly lower



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# Other Observations and Recommendations



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# Other Observations

- ❖ Although the mathematics results from the paper Bridge study do not show a significant difference from the eTIMSS results and the TIMSS 2015 results, this could be due to the large variance of the Bridge samples, the e-testing mode may still have an influence on the difference in students' mathematics achievement (as reflected in the international results on invariant trend items comparisons)
- ❖ The reasons for the difference in mathematics achievement, as compared to the 2015 cycle, may require more in-depth study/analysis of other factors

# Other Observations

- ❖ P4 mathematics & science results, as well as S2 mathematics results, in the Bridge study do not show a significant drop in achievement when compared to previous cycles of TIMSS, except for S2 science
- ❖ The Bridge study also shows that there is a higher percentage of P4 students reaching the “advanced” international benchmark of science at P4, as well as a higher percentage of S2 students reaching the “high” international benchmark of science, than their eTIMSS counterparts

# Other Observations

- ❖ P4 students have more e-testing experience than S2 students

Frequency on Taking Mathematics & Science Tests on Computer or Tablets – Primary 4

	Once a Month or More		Once or Twice a Year		Never	
	Hong Kong	International	Hong Kong	International	Hong Kong	International
<b>Primary 4</b>						
<b>Mathematics</b>	30% (4.5)	17% (0.4)	25% (3.6)	18% (0.4)	45% (4.9)	64% (0.4)
<b>Science</b>	31% (4.2)	17% (0.4)	26% (3.1)	14% (0.3)	43% (4.7)	69% (0.4)

Frequency on Taking Mathematics & Science Tests on Computer or Tablets – Secondary 2

	Once a Month or More		Once or Twice a Year		Never	
	Hong Kong	International	Hong Kong	International	Hong Kong	International
<b>Secondary 2</b>						
<b>Mathematics</b>	11% (2.6)	18% (0.4)	24% (4.0)	21% (0.5)	65% (4.3)	61% (0.5)
<b>Science</b>	14% (2.8)	20% (0.4)	25% (4.2)	20% (0.4)	61% (4.8)	61% (0.5)

# Other Observations

- ❖ Gender difference in achievement is not found in this cycle
- ❖ Considering the scale of home educational resources available, our students' performance in mathematics and science is still better than the predicted level
- ❖ Students with few resources have significantly lower mathematics and science achievement



# Other Observations

- ❖ Could these disadvantaged students be suffering from the lack of having adequate or access to digital/computer devices and/or the internet at home, which in turn affect their performance in this e-assessment?
- 香港社區組織協會於 2020 年 8 月下旬向該會服務的基層學童及家庭進行網上問卷調查，訪問 733 名貧窮兒童，當中逾三成 (33.7%) 受訪兒童家中沒有安裝上網，超過四成 (40.2%) 貧窮家中並無可上網的電腦，基層學生跟進這些學習遇到困難，包括：電腦太舊、無電腦、無上網，網速不夠、網量不夠、無列印機等現實問題，學習落後於人，拉闊貧富的學習差距 (<https://soco.org.hk/pr20200830/>)



# Other Observations

- ❖ Similar to previous cycles of TIMSS, despite the high achievement in mathematics and science, Hong Kong students' positive attitudes towards mathematics and science are relatively lower than many of the students in other countries/regions
- ❖ P4 students generally like learning mathematics and science more than S2 students
- ❖ They are also more confident in learning mathematics and science than S2 students

# Other Observations

- ❖ Could it be due to the increased difficulty in subject knowledge and skills required in secondary schools?
- ❖ There could be a cultural factor for the less positive attitudes towards mathematics and science among East Asian students
- ❖ Students might not have seen the importance of mathematics and science in their everyday life and future career (do not see the association between them)
- ❖ Although students might do well already, they feel that they have not met the standards of schools, teachers, parents, etc.  
→ no confidence, not happy, confused

# Recommendations

- ❖ Hong Kong students' performance in mathematics and science is shown to have decreased in this computer-based assessment of TIMSS, especially for S2 science  
Consideration should be given to preparing students for computer-based learning and assessment
- ❖ It is recommended that further studies be mounted to examine if there are factors other than the change to computer-based assessment that affect achievement scores

# Recommendations

- ❖ The drop in the percentage of students achieving advanced and high international benchmark of mathematics & science in P4, & high international benchmark of mathematics & science in S2, in 2019 is a concern. Steps should be taken to help the better performing students to fully achieve their potentials
- ❖ There is a significant increase in the percentage of S2 students not achieving the low international benchmark in 2019. It is important to help those less well performing students in order to maintain basic competency



# Other Recommendations

## ❖ What can be done?

- Provide suitable supportive measures for teachers when implementing the mathematics & science revised curricula in primary schools & secondary schools
- Timely review the primary & secondary revised curricula for the sake of enhancing the teaching and learning of mathematics & science, and to ensure that the content & skills are up-to-date & keeping pace with the modern mathematical, scientific & technological development, and that they are sufficiently challenging in developing our students for more advanced levels in the areas of mathematics & science

# Other Recommendations

## ❖ What can be done?

- Ensure the designed STEM activities & co-curricular activities conducted in schools allow students to learn the mathematics & science knowledge & concepts properly, and the activities are able to promote students' reasoning skills during the process
- Provide further professional training for front-line mathematics and science teachers to enhance the effectiveness of learning and teaching
- Allow more e-learning/e-assessment experience in school & at home



# Other Recommendations

## ❖ What can be done?

- Provide financial support/subsidy to disadvantaged students for having sufficient & adequate e-learning devices in trying to narrow the learning gap
- Possibility to implement standardized Chinese input training to students to facilitate e-learning/e-assessment efficiency (many of our students have difficulty in inputting Chinese characters & also require more time for word selection after writing pad or keyboard input)

# Other Recommendations

## ❖ What can be done?

- Give encouragement and positive feedback to students
- Let students know about the need of mathematics & science in different jobs (e.g. through school career advisors, promotional campaigns in schools or media, etc.) & how mathematics & science affect/relate to our daily lives
- Encourage participation in interesting mathematics- and/or science- related innovative activities and competitions (e.g. experiments outside the classroom, model construction, etc.)

# Caution

- ❖ We need to be cautious when interpreting ranking:
  - Participating countries differ from cycle to cycle
  - Take the standard error of measurement into consideration
- ❖ We need to be cautious when drawing causal relations:
  - This is a survey, not an educational experiment



# TIMSS Seminars in February

- ❖ Four half-day seminars will be hosted for schools and teachers in February 2021:
  - Primary Science: Feb. 22 (Monday) morning
  - Secondary Science: Feb. 22 (Monday) afternoon
  - Primary Mathematics: Feb. 23 (Tuesday) morning
  - Secondary Mathematics: Feb. 23 (Tuesday) afternoon
- ❖ The seminars will be more focused on teaching & learning
- ❖ TIMSS items will be used in the presentation and discussion
- ❖ Registration will start in late-January

# TIMSS Materials

- ❖ International reports of TIMSS 2019 may be downloaded at:  
→ <https://timss.bc.edu>
- ❖ Enquiries concerning TIMSS 2019:
  - Professor Frederick Leung – 2859-2355 / [frederickleung@hku.hk](mailto:frederickleung@hku.hk)
  - Mr. Yip, Hak Kwong – 2310-1081 / [yiphk@policy21.org](mailto:yiphk@policy21.org)
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  - Miss Ruby Leung – 3121-8068 / [rubyleung@policy21.org](mailto:rubyleung@policy21.org)
- ❖ HKIEA Centre Website: [www.fe.hku.hk/hkiea](http://www.fe.hku.hk/hkiea)



# Q&A Session



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~ The End ~



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