







# Overview of Accomplishment & Challenges of Hong Kong Basic Education:

From PISA 2000+ to PISA 2015

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- Content of Assessment in PISA
- Major Findings in PISA 2015
- Major Factors Related to Student Performance
- Major Accomplishment and Challenges of Hong Kong Basic Education

### Content of Assessment in PISA

### Research Design

- Age-based target population (15-year-olds)
- National samples of 150 schools with at least 5,400\* students (Computer-based assessment)
- Two hours of computer-based assessment for each student
- · Contextual questionnaires for students, parents, teachers and schools (30 mins each)
- Sample: 510,000 students from 72 participating countries/economies

### Content of Assessment in PISA

- 3 Literacy Domains
- Rotating major domains

#### Mathematical Literacy

Scientific Literacy

2006 2015



2003 2012

### Reading Literacy



2000 2009

#### Instruments

- Computer-based Assessment: Science, Reading, Mathematics, Problem Solving (2015)
- Questionnaires

### 72 Countries/Economies Participating in PISA 2015

OECD Countries			Partner Countries	(Non-OECD Cou	ntries/Economies)
Australia	Iceland	Portugal	Albania	Georgia	Peru
Austria	Ireland	Slovak Republic	Algeria	Hong Kong-China	Qatar
Belgium	Israel	Slovenia	Argentina	Indonesia	Romania
Canada	Italy	Spain	Brazil	Jordan	Russian Federation
Chile	Japan	Sweden	China (B-S-J-G)*	Kazakhstan	Singapore
Czech Republic	Korea	Switzerland	Bulgaria	Kosovo	Thailand
Denmark	Latvia	Turkey	Chinese Taipei	Lebanon	Trinidad and Tobago
Estonia	Luxembourg	United Kingdom	Colombia	Lithuania	Tunisia
Finland	Mexico	United States	Costa Rica	Macao-China	United Arab Emirates
France	Netherlands		Croatia	Malaysia	Uruguay
Germany	New Zealand		Cyprus	Malta	Vietnam
Greece	Norway		Dominican Republic	Moldova	
Hungary	Poland		Republic of Macedonia	Montenegro	
China (B-S-J-G) refers to the four PISA participating provinces or cities in China: Beijing, Shanghai, Jiangsu and Guangdong.					

### **HKPISA 2015 Research Team**

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Wong Wing Kei, Stephen, Kwai Chung Methodist College

#### **HKCISA Centre Advisors to RAC**

- Pang King Chee, K C Pang Consultants Ltd
- Tso Kai Lok, Elegantia College

### **HKPISA 2015 Sampling**

Explicit Strata	Implicit Strata	Total Number of Schools	Number of Participating Schools
Government	High Ability	15	6
	Medium Ability	7	2
	Low Ability	8	2
Aided	High Ability	119	45
	Medium Ability	115	37
	Low Ability	124	28
	(N/A)	1	1
Independent#	Local (DSS*)	59	17
	International	33	0
Total		481	138

#There is no implicit stratification for independent schools.

### **Grade Distribution (HKPISA2015)**

	Number of Participating Students	Proportion (%)
Grade/Form		
7/S1	59	1.1
8/S2	286	5.3
9/S3	1384	25.8
10/S4	3612	67.4
11/S5	18	0.3
Total	5359	100

<sup>\*</sup>DSS refers to schools under the Direct Subsidy Scheme.

### **Demographic Features of Participating Students**

	Number of Participating Students	Proportion (%)
Sex		
Female	2675	49.9
Male	2684	50.1
Total	5359	100
Place of Birth		
Hong Kong	3962	73.9
Non-Hong Kong	1227	22.9
Data Missing	170	3.2
Total	5359	100
Immigrant Status		
Native	3364	62.8
Second-Generation	1103	20.6
First-Generation	705	13.2
Data Missing	187	3.5
Total	5359	100

### Major Findings PISA 2015 Top 10

Scie	nce		Read	ling Mathema			matics	
Countries/ Economies	Mean	S.E.	Countries/ Economies Mean S.E.		Countries/ Economies	Mean	S.E.	
Singapore	556	(1.2)	Singapore	535	(1.6)	Singapore	564	(1.5)
Japan	538	(3.0)	Hong Kong-China	527	(2.7)	Hong Kong-China	548	(3.0)
Estonia	534	(2.1)	Canada	527	(2.3)	Macao-China	544	(1.1)
Chinese Taipei	532	(2.7)	Finland	526	(2.5)	Chinese Taipei	542	(3.0)
Finland	531	(2.4)	Ireland	521	(2.5)	Japan	532	(3.0)
Macao-China	529	(1.1)	Estonia	519	(2.2)	China (B-S-J-G)	531	(4.9)
Canada	528	(2.1)	Korea	517	(3.5)	Korea	524	(3.7)
Viet Nam	525	(3.9)	Japan	516	(3.2)	Switzerland	521	(2.9)
Hong Kong-China	523	(2.5)	Norway	513	(2.5)	Estonia	520	(2.0)
China (B-S-J-G)	518	(4.6)	New Zealand	509	(2.4)	Canada	516	(2.3)

### **Trend of Hong Kong Student Performance**

	Scien	ce <sup>#</sup>	Mathematics##		Reading###	
Cycle	Mean	S.E.	Mean	S.E.	Mean	S.E.
2000+	541	3.0	560	3.3	525	2.9
2003	539	4.3	550	4.5	510	3.7
2006	542	2.5	547	2.7	536	2.4
2009	549	2.8	555	2.7	533	2.1
2012	555	2.6	561	3.2	545	2.8
2015	523	2.5	548	3.0	527	2.7

# indicates that the science performance in 2015 is significantly lower than that from 2006 to 2012.

## indicates that the mathematics performance in 2015 is significantly lower than that in 2012.

### indicates that the reading performance in 2015 is significantly higher than that in 2003 and lower than that in 2012.

## Percentage of Students at Each Proficiency Level in Science in PISA 2015 (Hong Kong & OECD Countries)

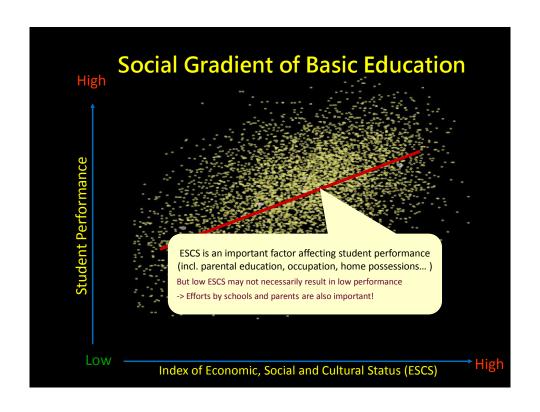
	Lower score limit	Hong Kong	OECD Average	Difference# (HK-OECD)	
Level 6	708	0.4%	1.1%	-0.6% ***	
Level 5	633	6.9%	6.7%	0.3%	
Level 4	559	27.4%	19.0%	8.4% ***	
Level 3	484	36.1%	27.2%	8.9% ***	]/
Level 2	410	19.7%	24.8%	-5.1% ***	<i>y</i>
Level 1a	335	7.8%	15.7%	-8.0% ***	
Level 1b	<b>261</b>	1.6%	4.9%	-3.4% ***	
Below Level 1b		0.1%	0.6%	-0.5% ***	

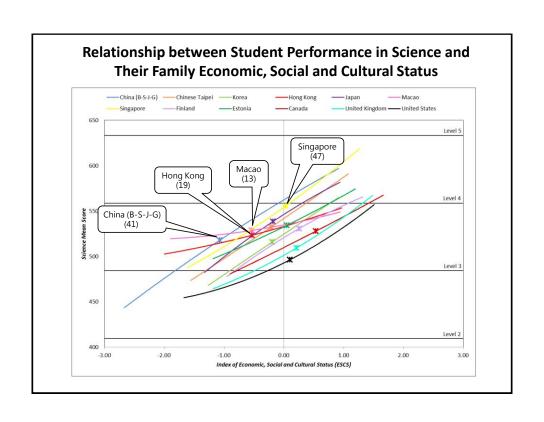
HK (7.4%) vs OECD (7.7%) 0.4% less at Level 5 or

HK (90.6%) vs OECD (78.8%): **11.8%** more at Level 2 or above

\*\*\* Significant difference (p < 0.001)

# The minor discrepancy in the difference is due to rounding of numbers.





### Change in Science Score for Every Unit Increase of Individual Economic, Social and Cultural Status

	PISA 2006		PISA 2009		PISA 2	PISA 2012		2015
	Social Gradient	S.E.	Social Gradient	S.E.	Social Gradient	S.E.	Social Gradient	S.E.
Science	26	(2.3)	19	(2.3)	21	(2.3)	19	(2.0)
Reading	22	(2.4)	17	(2.2)	20	(2.5)	19	(2.2)
Mathematics	26	(2.5)	24	(2.3)	27	(2.6)	22	(2.3)

		Difference	)
	2015 - 2006	2015 - 2009	2015 - 2012
Science	-7 <b>*</b>	0	-2
Reading	-3	2	-1
Mathematics	-5	-2	-5

## Effect of ESCS on Science Performance (PISA 2006 & 2015)

	Effect of Individual ESCS		Effect of School Mean ESCS	
	Change in science score for every unit increase of individual ESCS	S.E.	Change in science score for every unit increase of school mean ESCS	S.E.
2006	26	(2.3)	72	(8.3)
2015	19	(2.0)	55 ♥	(4.9)
Diff.	-7	(0.3)	-17	(3.4)

The effect of individual ESCS has decreased,

but the effect of school mean ESCS is still significant and substantial!

## Effect of ESCS on Mathematics Performance (PISA 2003 & 2012)

	Effect of Individual ESCS		Effect of School Mean ESCS		
	Change in mathematics score for every unit increase of individual ESCS	S.E.	Change in mathematics score for every unit increase of school mean ESCS	S.E.	
2003	31.2	(2.9)	90.4	(10.8)	
2012	27.0	(2.6)	65.1 ♥	(7.9)	
Diff.	-4.2	(3.9)	-25.3	(13.4)	

The effect of individual ESCS has decreased,

but the effect of school mean ESCS is still significant and substantial!

## Effect of ESCS on Reading Performance (PISA 2000+ & 2009)

	Effect of Individual		Effect of School Mean ESCS		
	Change in reading score for every unit increase of individual ESCS	S.E.	Change in reading score for every unit increase of school mean ESCS	S.E.	
2000+	28	(2.6)	71	(11.8)	
2009	17	(2.2)	32 ♥	(14.2)	
Diff.	-11	(3.4)	-39	(21.1)	

The effect of individual ESCS has decreased,

but the effect of school mean ESCS is still significant and substantial!

### **Equality of Basic Education**

- High vs Low Achievers
- Boys vs Girls
- Local and Immigrant Students

## Student Performance at 5th & 95th Percentile (From 2006 to 2015)

Comparison of High and Low Achievers' Performance in Science, Reading and Mathematics from PISA 2006 to PISA 2015

	PISA 2006				PISA 2009			PISA 2012				PISA 2015				
Percentile	5th		95	5th 5th		h	95th		5th		95th		5th		95th	
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.
Science	380	(6.2)	682	(3.1)	393	(7.3)	681	(3.3)	403	(7.1)	679	(3.4)	379	(5.5)	646	(3.2)
Reading	390	(6.2)	660	(2.7)	380	(5.5)	659	(3.1)	391	(6.4)	672	(4.1)	372	(5.6)	656	(3.5)
Mathematics	386	(6.1)	692	(4.8)	390	(5.1)	703	(4.7)	391	(5.9)	709	(4.3)	389	(5.8)	687	(4.6)

### Student Performance at 5th & 95th Percentile

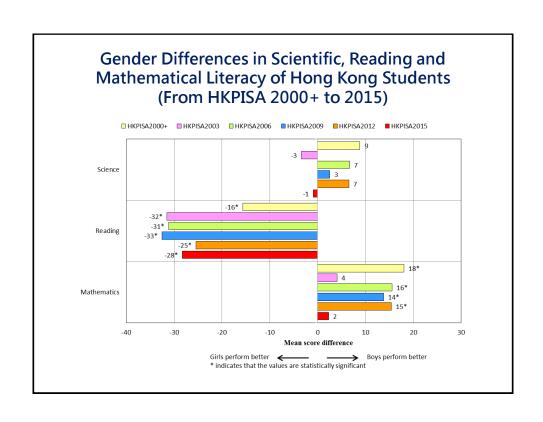
(From 2006 to 2015)

	Difference*									
-	2015	- 2006	2015	- 2009	2015 - 2012					
Percentile	5th	95th	5th	95th	5th	95th				
Science	-1	-36 ***	-14	-35 ***	-24 *	-34 ***				
Reading	-18	-4	-8	-2	-19	-16*				
Mathematics	4	-5	-1	-16*	-1	-22 **				

<sup>#</sup> The minor discrepancy in the difference is due to rounding of numbers.

The mean scores of both high and low achievers have dropped, but the decline of high achievers is greater than that of low achievers.

The science mean score of high achievers has dropped significantly from 2006,2009,2012 to 2015; the reading mean score of high achievers has dropped significantly from 2012 to 2015; the mathematics mean score of high achievers has also dropped significantly from 2009, 2012 to 2015.



### Gender Difference in Science, Reading and Mathematics Performance (From HKPISA 2006 to 2015)

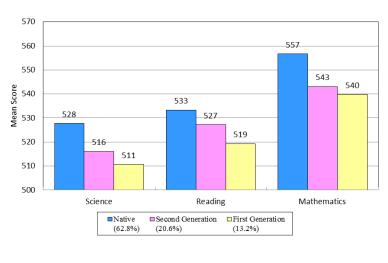
	PISA 2006			PISA 2009				PISA 2012				PISA 2015				
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.
Science	546	(3.5)	539	(3.5)	550	(3.8)	548	(3.4)	558	(3.6)	551	(3.1)	523	(3.1)	524	(3.4)
Reading	520	(3.5)	551	(3.0)	518	(3.3)	550	(2.8)	533	(3.8)	558	(3.3)	513	(3.4)	541	(3.6)
Mathematics	555	(3.9)	540	(3.7)	561	(4.2)	547	(3.4)	568	(4.6)	553	(3.9)	549	(3.6)	547	(4.3)

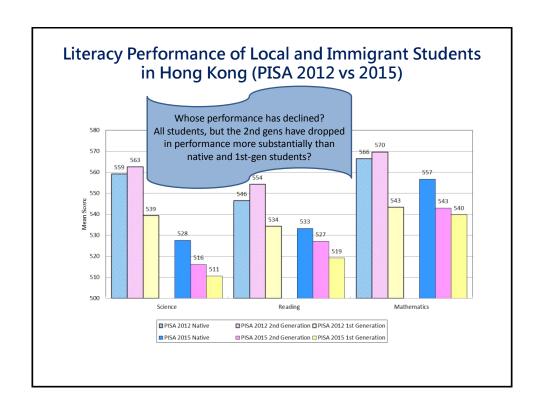
	Difference#									
	2015 -	2006	2015 -	- 2009	2015 - 2012					
•	Boys	Girls	Boys	Girls	Boys	Girls				
Science	-23 ***	-15 *	-27 ***	-24 ***	-35 ***	-28 ***				
Reading	-8	-10	-5	-9	-20 **	-17 *				
Mathematics	-6	7	-12	0	-19 **	-6				

Whose performance has declined? Both boys and girls, but the boys have dropped in performance more substantially than girls in all 3 domains?

# The minor discrepancy in the difference is due to the rounding of numbers.

### Literacy Performance of Local and Immigrant Students in Hong Kong (PISA 2015)





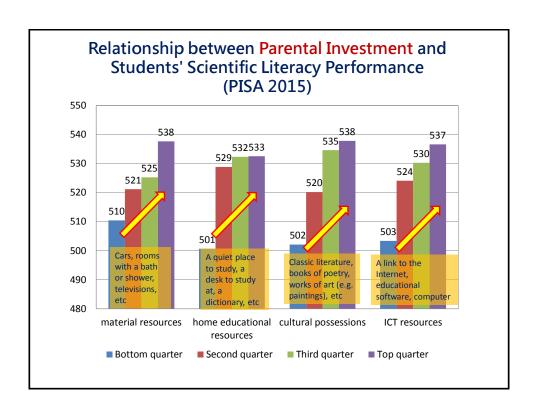
## Factors Related to Student Performance

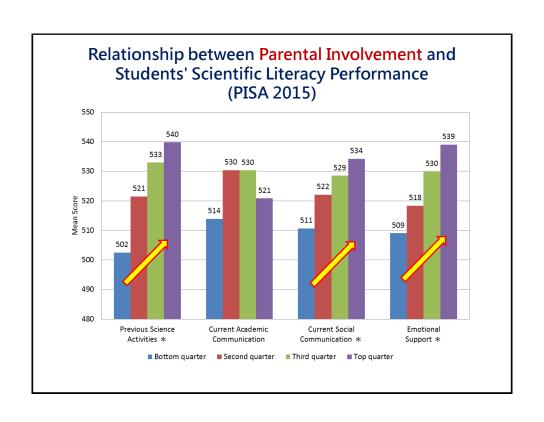
### \*Parent Level:

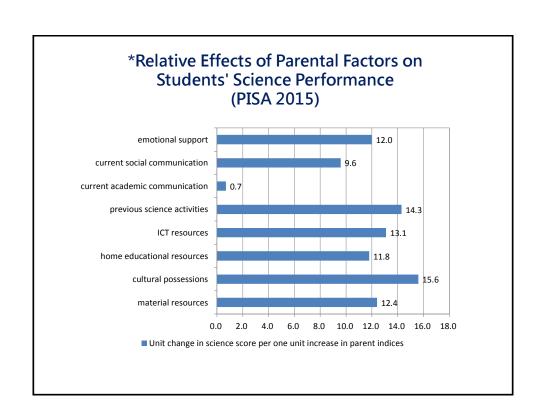
- Parental Involvement
- Parental Investment

### \*Teacher Level:

- Teacher-directed science instruction
- Adaptive instruction
- Perceived feedback
- Enquiry-based science instruction

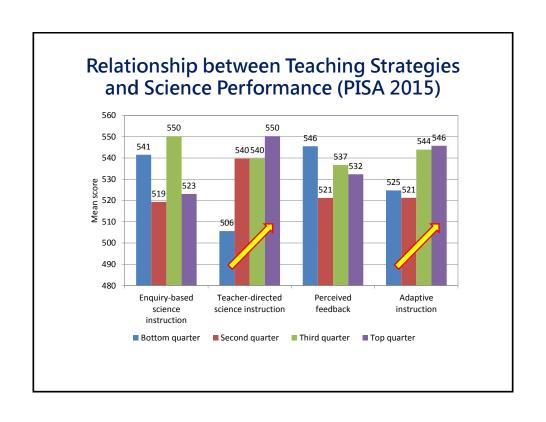


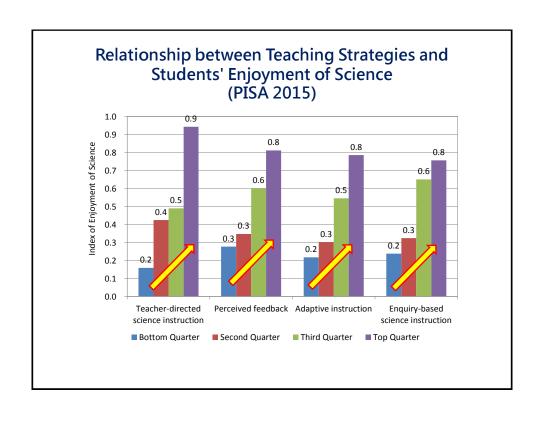


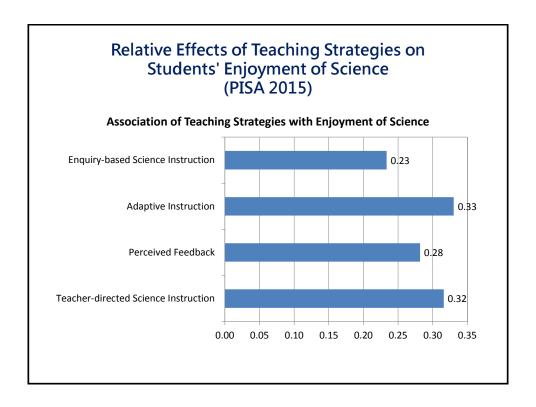


## Indices of Teaching Strategies in Science Class (PISA 2015)

Teaching strategies used by	PISA 2015				
science teachers	<u>Mean</u>	<u>S.E.</u>			
Teacher-directed science instruction	0.11	(0.02)			
Adaptive instruction	0.08	(0.03)			
Perceived feedback	0.16	(0.03)			
Enquiry-based science instruction	0.10	(0.02)			







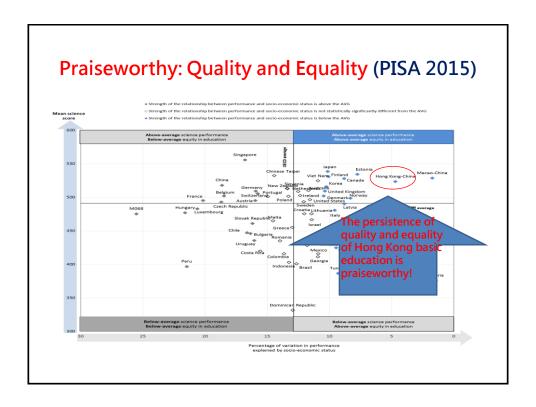
## Accomplishment (From PISA 2000+ to 2015)

### Quality:

- **Keep performing at the top 10** in science, reading and mathematics
- The four constructs of teaching practices are above the OECD average, and all of them are significant contributors to students' enjoyment of science; teacher-directed instruction and adaptive instruction are significant contributors to students' scientific literacy performance.

### **Equality:**

- Girls' performances in **mathematics and science** are no longer worse than boys'
- **Social gradient** is consistently low: Achievement gap between high and low ESCS students is not large
- **Effect of school mean ESCS** has decreased (but is still significant and substantial)



### Challenges (From PISA 2000+ to 2015)

- Science, reading and mathematics performances are worse than before
- · Low percentage of high achievers in Hong Kong
- Boys continue to perform more poorly than girls in reading
- Newly arrived immigrant students have declined in performance: Both first- and second-generation immigrant students perform more poorly than local born students and they require more support

### Acknowledgement

Aberdeen Technical School Baptist Lui Ming Choi Secondary School Baptist Wing Lung Secondary School Belilios Public School Buddhist Tai Hung College Buddhist Wong Wan Tin College Caritas Fanling Chan Chun Ha Secondary School Caritas St. Joseph Secondary School

Caritas Tuen Mun Marden Foundation Secondary Carmel Divine Grace Foundation Secondary School

Carmel Pak U Secondary School Chan Sui Ki (La Salle) College Cheung Sha Wan Catholic Secondary School China Holiness Church Living Spirit College Chiu Lut Sau Memorial Secondary School Choi Hung Estate Catholic Secondary School

Christ College Christian & Missionary Alliance Sun Kei Secondary

Christian Alliance S W Chan Memorial College Christian Nationals' Evangelism Commission Lau Wing Sang Secondary School Clementi Secondary School Cognitio College (Hong Kong) Confucian Tai Shing Ho Kwok Pui Chun College

Cotton Spinners Association Secondary School Cumberland Presbyterian Church Yao Dao Secondary School

Daughters of Mary Help of Christians Siu Ming Catholic Secondary School Delia Memorial School (Broad

ELCHK Lutheran Secondary School Elegantia College (Sponsored by Education

Evangel College

Fanling Lutheran Secondary School Fukien Secondary School Fukien Secondary School (Siu Sai Wan)

Fung Kai Liu Man Shek Tong Secondary School Fung Kai No.1 Secondary School Heep Yunn School

Heung To Middle School Heung To Middle School (Tin Shui Wai) HHCKLA Buddhist Leung Chik Wai College

HHCKLA Buddhist Ma Kam Chan Memorial English Secondary School Ho Dao College (Sponsored by Sik Sik Yue

Ho Lap College (Sponsored by the Sik Sik Yuen) Ho Ngai College (Sponsored by Sik Sik Yuen)
Ho Yu College and Primary School (Sponsored by Sik Sik Yuen)

Holy Trinity College Homantin Government Secondary School

Hon Wah College

Hong Kong And Macau Lutheran Church Queen Maud Secondary School Hong Kong Baptist University Affiliated School Wong Kam Fai Secondary and Primary School Hong Kong Sheng Kung Hui Bishop Hall Secondary

Hong Kong Taoist Association Tang Hin Memorial

Secondary School Hong Kong True Light College

Hong Kong Weaving Mills Association Chu Shek Lun Secondary School Kau Yan College

Kiangsu-Chekiang College (Shatin) King Ling College King's College

Kowloon Sam Yuk Secondary School Kowloon Tong School (Secondary Section)

Kwai Chung Methodist College Kwun Tong Kung Lok Government Secondary

Lee Kau Yan Memorial School Ling Liang Church M H Lau Secondary School Lingnan Secondary School Lions College

Lung Kong World Federation School Limited Lau Wong Fat Secondary School
Madam Lau Kam Lung Secondary School of Miu

Fat Buddhist Monastery

Maryknoll Convent School (Secondary Section) Munsang College Newman Catholic College

Ning Po No.2 College Po Chiu Catholic Secondary School Po Leung Kuk Laws Foundation College

Po Leung Kuk Lee Shing Pik College
Po Leung Kuk Lo Kit Sing (1983) College
Po Leung Kuk Mrs Ma Kam Ming-Cheung Fook Sien

Po Leung Kuk Tong Nai Kan Junior Secondary

College Po Leung Kuk Vicwood K.T. Chong Sixth Form

Po Leung Kuk Wu Chung College Po Leung Kuk Yao Ling Sun College Pok Oi Hospital Tang Pui King Memorial College Pui Ching Middle School Pui Shing Catholic Secondary School

Queen Elizabeth School
Queen Elizabeth School Old Students' Association Secondary School

Queen's College Old Boys' Association Secondary S.K.H. Bishop Baker Secondary School

S.K.H. Bishop Mok Sau Tseng Secondary School S.K.H. Lam Woo Memorial Secondary School

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SALEM - Immanuel Lutheran College Shatin Tsung Tsin Secondary School
Shau Kei Wan East Government Secondary School Sheung Shui Government Secondary School

Shun Tak Fraternal Association Lee Shau Kee Shun Tak Fraternal Association Leung Kau Kui

College Shun Tak Fraternal Association Seaward Woo

College South Tuen Mun Government Sec Sch St. Bonaventure College And High School St. Catharine's School For Girls, Kwun Tong

St. Francis' Canossian College

St. Francis Xavier's College St. Joseph's Anglo-Chinese School St. Joseph's College

St. Louis School St. Margaret's Girls' College, Hong Kong

St. Mark's School St. Paul's Co-Educational College St. Paul's College

St. Paul's School (Lam Tin) St. Stephen's Church College St. Stephen's Girls' College

St. Teresa Secondary School Stewards Ma Kam Ming Charitable Foundation Ma Ko Pan Memorial College

Stewards Pooi Tun Secondary School

Tack Ching Girls' Secondary School Tak Oi Secondary School

The Association of Directors & Former Directors of Pok Oi Hospital Ltd. Leung Sing Tak College The Bishop Hall Jubilee School

The Chinese Foundation Secondary School

The Church of Christ In China Chuen Yuen College
The Church of Christ In China Kei Chi Secondary School The Church of Christ In China Kei Long College The Church of Christ In China Kei San Secondary School

The Church of Christ In China Kei To Secondary School The Church of Christ In China Rotary Secondary School The Hong Kong Chinese Christian Churches Union Logos Academy The Jockey Club Eduyoung College

The Methodist Church Hong Kong Wesley College The Methodist Lee Wai Lee College The Mission Covenant Church Holm Glad College

The Pentecostal Holiness Church Wing Kwong College The Salvation Army William Booth Secondary School The True Light Middle School of Hong Kong

Tin Ka Ping Secondary School Tin Shui Wai Government Secondary Scho True Light Girls' College Tsuen Wan Government Secondary School

Tsuen Wan Public Ho Chuen Yiu Memorial College Tsung Tsin Christian Academy Tuen Mun Catholic Secondary School

Tung Wah Group of Hospitals Li Ka Shing College Tung Wah Group of Hospitals Lo Kon Ting Memorial College

Tung Wah Group of Hospitals S.C. Gaw Memorial College Tung Wah Group of Hospitals Wong Fut Nam College Tung Wah Group of Hospitals Yau Tze Tin Memorial College United Christian College

United Christian College (Kowloon East)
Valtorta College
Workers' Children Secondary School

Yan Chai Hospital Law Chan Chor Si College Yan Chai Hospital Lim Por Yen Secondary School

Yan Chai Hospital No. 2 Secondary School Yan Chai Hospital Wong Wha San Secondary

Yan Oi Tong Tin Ka Ping Secondary School









### Thank you!

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