

**For discussion
on 14 November 2016**

Legislative Council Panel on Education

Promotion of Science, Technology, Engineering and Mathematics (STEM) Education

Purpose

This paper briefs Members on the latest development and way forward in the promotion of Science, Technology, Engineering and Mathematics (STEM) education as well as seeks Members' support for a proposed one-off grant to secondary schools¹ for school-based STEM-related activities.

Background

2. STEM is an acronym that refers collectively to the academic disciplines of Science, Technology, Engineering and Mathematics. The promotion of STEM education aligns with the worldwide trend of equipping students for the rapid economic, scientific and technological developments, as well as the changes and challenges in society and around the world. In the context of the Hong Kong school curriculum, STEM education is promoted through the Science, Technology and Mathematics Education Key Learning areas (KLAs) as well as relevant student activities such as competitions and project learning activities.

3. In the 2015 and 2016 Policy Addresses, the Government pledged to renew and enrich the curricula and learning activities of Science, Technology and Mathematics, enhance the training of teachers, step up efforts to promote STEM education and encourage students to pursue the study of STEM-related subjects. As illustrated by student achievements since then, STEM education is able to cultivate students' learning interest, enhance their capacity to collaborate and innovate, as well as develop their creativity and problem solving skills. Students find their study more fulfilling, and Hong Kong's competitiveness would ultimately be enhanced.

¹ Including special schools with a secondary section

Aims and Strategies for the Promotion of STEM Education

Aims

4. The promotion of STEM education aims to develop students to become lifelong learners of science and technology, enabling them to realise their potential to meet the challenges of the 21st century, and from a wider perspective, nurturing versatile talents for Hong Kong with different levels of knowledge and skills, so as to enhance the international competitiveness of Hong Kong, and in so doing contributes to national developments.

Support Strategies

5. Starting from 2015, a host of support measures are being stepped up to promote STEM education. These include, amongst others, (a) updating/renewing the related curricula; (b) strengthening teacher professional development programmes; (c) enriching learning and teaching resources; (d) organising a wide array of STEM-related activities/ competitions; (e) setting up Professional Development Schools to showcase and disseminate good practices; (f) forging community partnerships to synergise efforts; as well as (g) consulting stakeholders to collect feedback and suggestions on the way forward. Please see annexes 1 to 6 for further details of measures (a) to (f).

Consultation and Feedback from Stakeholders

6. A public consultation document entitled *Promotion of STEM Education – Unleashing Potential in Innovation* was released in November 2015. On top of setting out the aims and objectives, the document also recommended six strategies for promoting STEM education. These are (1) renewing the curricula of Science, Technology and Mathematics Education KLAs; (2) enriching learning activities for students; (3) providing learning and teaching resources; (4) enhancing professional development of schools and teachers; (5) strengthening partnerships with community key players; and (6) conducting review and disseminating good practices.

7. On the whole, very positive responses to the consultation have been received from schools and relevant stakeholders, including professional bodies, tertiary educators, parents and the general public, who generally support the aims and objectives, the proposed implementation strategies and the recommended approaches to organising learning activities on STEM education.

A summary of the major feedback is in Annex 7. Due to the positive feedback on the recommended strategies, they would be implemented step by step. The updated Curriculum Guides of Science, Technology and Mathematics Education would also be issued soon.

Achievements of STEM Education

8. Capitalising on their individual strengths and building on the interest of their students, schools have demonstrated vigor and creativity in forging ahead with promoting STEM at the school level. For example, some primary schools have channeled resources to procuring services for organising STEM-related courses on robot building and model car construction. Others have decorated their activity rooms and procured building blocks/components on mechanics and coding for students to conduct projects on various STEM-related themes.

9. At the secondary level, with STEM education as one of the curriculum emphases, some schools have deployed existing resources to procure kits for exploring biotechnology, building robots, programming single-board computers for sensing and controlling experiments, writing mobile apps for science experiments, etc., to facilitate students' design of scientific investigation and realisation of their concepts in design and make projects. With such conducive learning environment and facilities, schools have found students to be more motivated in learning and actively engaged in searching information whether online or from other sources, discussing and collaborating closely with peers, producing innovative artefacts/designs and demonstrating self-confidence/competence in their learning. Some schools have gone a step further by nominating their students to participate in local, national and international competitions with very good results obtained.

10. All along, many schools have demonstrated remarkable achievements in different STEM-related projects and activities. At the first-ever Student Education Fair on Science, Technology and Mathematics held in January 2016, a total of 80 primary and secondary schools presented their STEM-related projects. In the 57th International Mathematical Olympiad (IMO)² held in Hong Kong in July, our students performed very well and Hong Kong was ranked 9th among the 109 participating countries/regions. At Annex 4 is a list of major STEM-related activities/competitions. Some of the awardees and participants in these activities/competitions have gone on to pursue studies in STEM-related

² The 57th IMO was hosted by the International Mathematical Olympiad Hong Kong Committee Limited (IMOHKCL) with The Hong Kong University of Science and Technology as the hosting university and EDB as the supporting organisation.

programmes in the secondary school level and/or during post-secondary studies, or even set up related business. Last but not least, Hong Kong students have also performed well in major international assessments. In the latest reports on PIRLS³ (2011), TIMSS⁴ (2011) and PISA⁵ (2012), our primary and secondary students ranked among the top five in reading and mathematical literacy and top ten in scientific literacy. These are the strengths where STEM education is built on.

Additional Funding Support

11. To sustain the momentum in fostering STEM education as described in paragraphs 8 to 10, and to add new impetus in the effort, we see a need for a dedicated one-off cash grant to all secondary schools. Indeed, similar resources have been made available to primary schools earlier this year to strengthen the schools' capacity in planning and organising STEM-related activities. Some primary schools have made use of the grant to purchase equipment/resource materials while others to organise learning activities.

12. The proposed grant would help to engage more secondary schools and their students to embark on the STEM journey riding on the foundation of knowledge and skills they have acquired at the primary level. This will enhance the overall coherence of our STEM development strategy and give every student, not just those with noticeable talents in this area, the opportunity to be exposed to platforms and activities that may engender their interest and unleash their hidden potential in STEM.

13. The proposed grant would enable schools to acquire the necessary resources (e.g. teaching aids, consumables, learning and teaching resource materials) and upgrade some existing facilities as schools kick-start or continue to implement their school-based STEM-related activities. It would also help schools to organise activities such as school-based scientific and technological activities/competitions, and sponsor students to participate in various local, national and international competitions/exhibitions/programmes. We propose to disburse a one-off grant of \$200,000 for each public sector secondary school⁶, including special schools with a secondary section, and also for each local secondary school under the Direct Subsidy Scheme to step up the effort to prepare and support school-based STEM-related initiatives. Recognising that

³ Progress in International Reading Literacy Study

⁴ Trends in International Mathematics and Science Study

⁵ Programme for International Student Assessment

⁶ Public sector secondary schools include government, aided and caput schools.

STEM education targets students of different background and capabilities, and that individual schools may have their own pace or preferred areas of development, we will allow flexibility for schools to deploy the \$200,000 STEM grant to meet their needs. These may include purchasing/replenishing equipment/resource materials, organising related learning activities and providing support to their students to participate in various competitions/programmes.

14. With the provision of this STEM grant, it is expected that schools would have a stronger incentive to sustain and/or enhance their existing school-based activities/projects on STEM education and kick-start some other new initiatives. Moreover, it is expected that there would be wider participation of schools and students in STEM related activities in partnership with different organisations, as well as greater interest on the part of students in pursuing further studies in STEM related programmes in universities and vocational and professional education and training. Teachers' curriculum leadership would also be nurtured further through training programmes. Guidelines will be issued to secondary schools on the use of this STEM grant. Schools' use of the STEM grant will be subject to similar monitoring of other purpose-specific grants to schools, including reflecting the income and expenditure in the audited accounts to be submitted to EDB annually.

15. The estimated expenditure for the proposed one-off grant of \$200,000 for all secondary schools will be about \$102.6 million. Schools will be allowed to use the grant until the end of the 2018/19 s.y. and the unspent provision will be clawed back.

Advice sought

16. Members are invited to give views and advice on the development of STEM education. Subject to Members' comments, we will seek funding approval from the Finance Committee (FC) of the Legislative Council for the proposed one-off grant to secondary schools and payments will be disbursed in 2016-17 shortly after the FC's approval.

Education Bureau
November 2016

Updating of Relevant KLA/Subject Curriculum Guides

(as at late October 2016)

KLA/Subject Curriculum Guides	Timeline
Science Education	
<ul style="list-style-type: none"> Science Education KLA Curriculum Guide 	Available in 2016/17 s.y.
Technology Education	
<ul style="list-style-type: none"> Technology Education KLA Curriculum Guide 	Available in 2016/17 s.y.
<ul style="list-style-type: none"> The enriched Technology Education KLA curriculum (S1- 3) 	Full implementation in 2016/17 s.y.
<ul style="list-style-type: none"> Senior Secondary Information and Communication Technology Curriculum & Assessment Guide 	Implemented in S4 from 2016/17 s.y.
Mathematics Education	
<ul style="list-style-type: none"> Mathematics Education KLA Curriculum Guide 	Available in 2016/17 s.y.
Primary General Studies	
<ul style="list-style-type: none"> General Studies for Primary Schools Curriculum Guide (P1-6) 	Feedback is being collected in Nov 2016

Professional Development Programmes (PDPs) of STEM Education Series

2015/16 s.y.

A. Cross-KLA PDPs including Symposium and Networking Activities (*Participants: 368*)

1. Symposium cum Consultation Briefing on Science, Technology and Mathematics Education: Promotion of STEM Education – Unleashing Potential in Innovation
2. Enhancing Students’ Computational Thinking through General Studies

B. KLA-based/Subject-based PDPs

(I) “Understanding & Interpreting the Curriculum” and “Curriculum Planning” (*Participants: 1,749*)

1. Holistic Curriculum Development for Science Education Key Learning Area for Facilitating Learning and Teaching
2. Briefing Seminar on the Updated Science (S1-3) Curriculum
3. Curriculum Planning and Effective Use of Resources in Teaching Business at Junior Secondary Level
4. Curriculum Management, Planning and Leadership in Teaching ICT Learning Elements and Effective Use of Resources at the Junior Secondary Level
5. Understanding and Interpreting the Senior Secondary Technology and Living Curriculum
6. Curriculum Management, Planning and Leadership in Home Economies/Technology and Living
7. Curriculum Management and Planning Enrich Technology Education KLA Curriculum: Workshop Organisation and Safety
8. Current Position and Role of Technological Development in the Mainland
– Visit to the Innovation Technology Industry
9. Understanding and Interpreting the Senior Secondary Mathematics Curriculum
10. Curriculum Leadership and Curriculum Planning for Secondary Mathematics Teachers
11. Primary Mathematics Curriculum Learning and Teaching Series :
 - The Curriculum Planning and Implementation of STEM Education
 - School-based Curriculum Planning and Implementation
12. Primary Mathematics Curriculum Induction Series: Mathematics Panel Chairpersons
13. Promoting STEM Education in Mathematics
14. Seminar on the STEM education and e-learning in Primary General Studies

(II) “Learning, Teaching and Assessment” and “Enriching Knowledge” (*Participants: 1,781*)

1. Seminar on Implementing STEM Education in Science Class

2. Talks on “Global Education Trend – How to Implement STEM Education” by Prof. Jonathan Osborne of Stanford University
3. Learning and Teaching Strategies (for the Senior Secondary Technology and Living curriculum)
4. Assessment for Learning (for the Senior Secondary Technology and Living curriculum)
5. Effective Learning and Teaching of Home Economies/ Technology and Living Series
6. Effective Use of Electronic Learning and Teaching Resource Materials in Home Economies/Technology and Living
7. Effective Use of Simplified Resources Materials in and Other e-Resources in Learning and Teaching of Design and Applied Technology
8. 3D Modelling Skills for 3D Printing
9. Promote Innovative Design with 3D Printing Technology
10. Control Technology and Innovative Robotics
11. Using Single-board Computers in Teaching Programming in Computer Subjects
12. Mathematics World Lecture Series
13. One-day Workshop on Science and Technology in General Studies

(III) Networking Activities (*Participants: 1,058*)

1. Territory-wide Briefing Session on Professional Development Schools
2. Seminar on Professional Development Schools
3. Consultation Seminar on the Ongoing Renewal of the School Curriculum: Focusing, Deepening and Sustaining - Mathematics Education KLA Curriculum
4. Networking Activities of Professional Development Schools (Primary General Studies)
5. Networking Activities (by district) - Science and Technology in Primary General Studies

2016/17 s.y.

A. Cross-KLA PDPs

(I) Symposium, Enriching Knowledge and Networking Activities (*Planned places: 2,230*)

1. Symposia on STEM Education
2. Seminars on Knowledge Enrichment for Teachers on STEM Related Areas
3. Sharing on the Good Practices of Promoting STEM Education for Secondary Schools (I)
4. Sharing on the Good Practices of Promoting STEM Education for Secondary Schools (II)
5. Sharing on the Good Practices of Promoting STEM Education for Primary Schools
6. Enhancing Students’ Computational Thinking through General Studies

B. KLA-based/Subject-based PDPs

(I) “Understanding & Interpreting the Curriculum” and “Curriculum Planning”

(Planned places: 3,400)

1. Holistic Curriculum Development for Science Education Key Learning Area for Facilitating Learning and Teaching
2. Understanding and Interpreting the Updated Science (S1-3) Curriculum
3. Curriculum Management, Planning and Leadership in Teaching Information and Communication Technology knowledge context at the Junior Secondary Level
4. Understanding and Interpreting the Senior Secondary Technology and Living Curriculum
5. Curriculum Management, Planning and Leadership in Home Economies/Technology and Living
6. Curriculum Management and Planning Enriched Technology Education KLA Curriculum: Workshop Organisation and Safety
7. Current Position and Role of Technological Development in the Mainland – Visit to the Innovation Technology Industry
8. Curriculum planning for teaching Computational Thinking
9. Ongoing Curriculum Renewal – Updating of Mathematics Education KLACG
10. Understanding and Interpreting the Senior Secondary Mathematics Curriculum
11. Curriculum Leadership and Curriculum Planning for Secondary Mathematics Teachers
12. Primary Mathematics Curriculum Learning and Teaching Series : The Curriculum Planning and Implementation of STEM Education
13. Induction for New General Studies Panel Heads of Primary Schools
14. Seminar on Implementation of the Updated General Studies Curriculum for Primary Schools Series: Interpreting and Managing the General Studies Curriculum

(II) “Learning, Teaching and Assessment” and “Enriching Knowledge”

(Planned places: 2,100)

1. Seminar on Implementing STEM Education in Science Class
2. Learning and Teaching of the Updated Science (S1-3) Curriculum
3. Learning and Teaching Strategies (for the Senior Secondary Technology and Living curriculum)
4. Assessment for Learning (for the Senior Secondary Technology and Living curriculum)
5. Food Science behind Food Product Development
6. Effective Use of Electronic Learning and Teaching Resource Materials in Home Economies/Technology and Living - Principles of Food Processing and Technology
7. Use of Simplified Resources Materials and Related Support Measures in DAT
8. 3D Modelling Skills for 3D Printing
9. Promote Innovative Design with 3D Printing Technology
10. Graphical Presentation and Modelling – From Idea to Realisation
11. Control Technology and Innovative Robotics
12. Using single-board computers in Teaching Programming in Computer Subjects
13. Teaching Computer Awareness Programme at the Junior Secondary Level

14. Teaching Programming by Using Modular Approach and Subtasks
15. Using Visual Programming Language Tools in Developing Students' Programming Skills
16. Using Online Program System to Assess Student Learning Programming in ICT
17. Effective Use of Learning and Teaching Resource Materials in Teaching Algorithm Testing
18. Effective Learning and Teaching of Computational Thinking
19. Promoting STEM Education in Mathematics
20. Data Handling and STEM Education
21. Use of e-Learning to Enhance the Learning and Teaching of Primary Mathematics
22. Application of Mathematics

(III) Networking Activities (*Planned places: 1,200*)

1. How to Stretch Students' Potential through STEM related activities in Science Learning
2. Workshop on STEM Education in primary GS
3. Networking Activities of Professional Development Schools (Primary General Studies)

STEM-Related Learning and Teaching Resources and Other Relevant Support**(I) Ongoing development items from 2015/16 s.y.**

Categories	Items
Learning and teaching activities	<ul style="list-style-type: none"> • Disbursement of STEM Grant to all primary schools • Production of Learning and Teaching Materials on Science, Technology, Engineering and Mathematics (STEM) Education for Science Education Key Learning Area –Science (S1-3) curriculum • Unplugged Activities for Learning and Teaching of Programming at Upper Primary and Junior Secondary Levels • Algorithm Testing on Scratch • Development of electronic learning and teaching resource materials <ul style="list-style-type: none"> - “Basic Food Science” - “Principles of Food Processing and Technology” • Production of learning and teaching materials on STEM elements in Mathematics through the Seed Project “Exploration and Development of Effective Strategies for Promoting and Implementing STEM Education in Secondary Mathematics” • Production of 7 sets of Learning and Teaching Resource CD for Primary General Studies
Cross-curricular/ cross-KLA projects	<ul style="list-style-type: none"> • 5 examples in the updated Science Education Key Learning Area Curriculum Guide (KLACG) (on holistic curriculum planning, science process skills, project learning, e-learning and the use of mobile learning for investigative study) • 3 examples in the updated Mathematics Education KLACG (on “Rubber Band Powered Car”, “Four Seasons” and “Healthy Diet Menu”) • 3 examples in the updated Technology Education KLACG (on “Smart Greenhouse”, “Developing students’ coding capability: Simulation package for the cat to find the mouse” and “Weekly menu for school lunch box supplier”) • 3 examples in Learning and Teaching Resource CD for Primary General Studies (on “ Making Noise Barriers”, “ Making Maglev Trains” and “Making Skyscrapers”)

Categories	Items
Annotated school practices	<ul style="list-style-type: none"> • Cases of the 4 Professional Development Schools • Cases of the 6 Seed Schools (4 Secondary + 2 Primary) • ETV on STEM Education (II)
LWL activities and competitions	[Refer to the list of major local activities/competitions in Annex 4]
Reference materials	<ul style="list-style-type: none"> • Lists of EDB Resource Materials to Support Curriculum Development and Learning and Teaching of Science, Technology, Mathematics and Primary General Studies in respective Curriculum Guides • Lists of Community Resources for Science, Technology and Mathematics Education in respective Curriculum Guides • STEM Website

(II) Other Learning and Teaching Resources for STEM Education Developed by EDB

Item	Type
《小學常識科學與教資源光碟 - 光、聲、電》2015	DVD
《小學常識科學與教資源光碟 - 生物世界》2016	DVD
《小學常識科學與教資源光碟 - 力與簡單機械》2016	DVD
《小學常識科學與教資源光碟 - 探索太陽系 物料科學》2016	DVD
機械鬥一番 2009	DVD
Basic Food Science	Reference materials for teachers
Case Study for Design and Applied Technology (Secondary 4-6) i. Case 6 - Environmental Technology: Hydrogen-powered Car	Reference materials for teachers
Case Study for Technological Subjects (Secondary 1-3) i. Case 1 - Design Process with Ergonomic ii. Case 4 - 3G: Green Design, Green Technology and Green Enterprise	Reference materials for teachers
Courseware on File Organisation and Computer Communication (Chinese version only)	Online resource
Curriculum Resources for Infusing Ideas about Nature and History of Biology and Scientific Inquiry into the Learning and Teaching of Senior Secondary Biology	Resource package
Curriculum Resources for Infusing Science-Technology-Society-Environment Connections into the Learning and Teaching of the Senior Secondary Biology Curriculum	Resource package
Curriculum Resources for the Learning Element Modules related to Technological Subjects under the enriched TEKLA Curriculum (Secondary 1-3)	Reference materials for teachers
Web-based Learning Courses for Gifted/More Able Students (offered by EDB and HKAGE)	Online course
Food Tests	Reference materials for teachers
Infusing Process and Thinking Skills into Science Lessons	Resource package
Investigative Lab	Online resource
Investigative Study in Chemistry - Exemplars of Learning and Teaching Activities	Booklet and ETV programme
Learning and Teaching Resources for Senior Secondary Biology Curriculum: Problem-based Learning	Resource package

Item	Type
Popular Physics resources i. Contextual Physics ii. Energy Efficiency iii. Ocean Park Physics iv. Physics World v. Medical Physics vi. Atomic World	Online resource
Meal Planning	Reference materials for teachers
Multimedia Production – Multimedia Presentation	Online resource
Production of Food Products	Reference materials for teachers
Programming and Programming Languages – Graphics Handling using Pascal	Online resource
Programming and Programming Languages – Structured Query Language (SQL)	Online resource
Programming and Programming Languages – Tracing simple programs in C++, Prolog and SQL	Online resource
Programming and Programming Languages – Visual Basic Programming	Online resource
Promoting Assessment for Learning in Junior Secondary Science through Identifying Students’ Learning Difficulties from Secondary Analysis of TIMSS and Refining Classroom Learning & Teaching Practices	DVD
ETV on STEM Education (I)	ETV Programme
The Research Journey of Scientists – Accomplishment and Perseverance i. The “Bright” Future of Scientific Research ii. The Future of Rice iii. Soybean Homecoming iv. A New Dimension of Communication	ETV Programmes
Textile Tests	Reference materials for teachers
Theme based learning resource for Design and Applied Technology (Secondary 4-6) i. Theme 2 – High Speed Rail ii. Theme 7 – Free Bird iii. Theme 9 – Sustainable Architecture iv. Theme 10 – Chinese Space Exploration Programme	Resource package
Towards Quality Learning and Teaching - Technology and Living (Food Science and Technology Strand)	Reference materials for teachers
數學百子櫃系列（四）談天說地話數學	Book
數學百子櫃系列（五）數學的應用圖像處理—矩陣世紀	Book

Item	Type
數學百子櫃系列（六）數學的應用投資組合及市場效率	Book
數學百子櫃系列（七）數學的應用：基因及蛋白的分析	Book
數學百子櫃系列（八）概率萬花筒	Book
數學百子櫃系列（二十）宇宙尺度的變異定律	Book

STEM-Related Activities/Competitions**(I) Key Student Activities held/to be held in 2016/17 s.y.****(i) InnoTech Expo 2016**

Date: 24 September 2016 to 1 October 2016

Time: 10:30 a.m. – 8:00 p.m.

Venue: Halls 3F and 3G, Hong Kong Convention and Exhibition Centre

Description:

This event is organised by Our Hong Kong Foundation with Education Bureau as a supporting organisation, aiming to enable students to learn more about achievements of the Mainland and Hong Kong in science and technology, become aware of the importance of scientific and technological innovation, as well as consider science and technology innovation as their career. The event includes a large-scale exhibition cum forums, talks and video viewing activities showcasing the achievements with regard to science and technology in the Mainland and Hong Kong.

(ii) Inter-school Cross-curricular Project Competition on Climate Change

Date: October 2016 to mid 2017

Description:

This competition is organised for local primary and secondary students, aiming to encourage students to apply cross-curricular knowledge to produce small inventions or to propose innovative ways to enhance Hong Kong's mitigation, adaptation and resilience action on climate change.

(iii) World Skills Hong Kong Competition cum Carnival 2017

Date: 16 - 17 June 2017

Venue: Hong Kong Convention and Exhibition Centre

Description:

This event aims to enhance public awareness of and interest in skills competition and promote Vocational and Professional Education and Training (VPET). As part of the programmes, a collection of activities including STEM-related competitions, workshops and demonstrations will be organised by EDB for students to showcase the skills-related learning outcomes and to develop their career interest.

(II) Other Major Activities/Competitions

Local

- 「常識百搭」科學專題探究展覽
- Hong Kong Budding Scientists Award (香港科學青苗獎)
- InnoCarnival (創新科技嘉年華)
- Hong Kong Robotic Olympiad (香港機械奧運會)
- Mathematics Project Competition for Secondary Schools (中學數學專題習作比賽)
- Mathematics Book Report Competition for Secondary Schools (中學數學閱讀報告比賽)
- Hong Kong Physics Olympiad (香港物理奧林匹克)
- Hong Kong Olympiad in Informatics (香港電腦奧林匹克競賽)
- International Junior Science Olympiad - Hong Kong Screening (國際初中科學奧林匹克—香港選拔賽)
- International Mathematical Olympiad Preliminary Selection Contest (國際數學奧林匹克香港選拔賽)
- Statistical Project Competition for Secondary School Students (中學生統計習作比賽)
- Statistics Creative-writing Competition for Secondary School Students (中學生統計創意寫作比賽)
- Hong Kong Student Science Project Competition (香港學生科學比賽)
- Hong Kong Youth Science and Technology Innovation Competition (香港青少年科技創新大賽)
- Joint School Science Exhibition (聯校科學展覽會)
- SciPOP Science Presentation Contest and Young Scientists Study Tour (科普快遞科學演示比賽及青苗科學家研習活動)

Mainland

- 高校科學營
- Chinese Mathematical Olympiad (中國數學奧林匹克)
- China Adolescents Science and Technology Innovation Contest (全國青少年科技創新大賽)

Regional

- Asian Physics Olympiad (亞洲物理奧林匹克)

International

- International Olympiad in Informatics (國際電腦奧林匹克競賽)
- Intel International Science and Engineering Fair (Intel ISEF) (英特爾國際科學與工程大獎賽)
- International Mathematical Olympiad (國際數學奧林匹克)
- International Physics Olympiad (國際物理奧林匹克)
- International Robotic Olympiad (機械奧運會國際賽)

Professional Development Schools (PDS) for STEM Education
in 2016/17 s.y.

Schools	<ul style="list-style-type: none">• Aberdeen Technical School• Ho Yu College and Primary School (Sponsored by Sik Sik Yuen)• Lok Sin Tong Yu Kan Hing Secondary School• Maryknoll Fathers' School
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Major Community Partners in the Promotion of STEM Education

- AFCD Lions Nature Education Centre
- Agriculture, Fisheries and Conservation Department
- Arts & Technology Education Centre
- Association of I.T. Leaders in Education
- British Council Hong Kong
- Caritas Chan Chun Ha Field Studies Centre
- Census and Statistics Department
- City University of Hong Kong
- CLP Power Hong Kong Limited
- Committee on Home-School Co-operation
- Environmental Protection Department
- Ho Koon Nature Education cum Astronomical Centre (Sponsored by Sik Sik Yuen)
- Hong Kong Association for Science and Mathematics Education
- Hong Kong Association of Careers Masters and Guidance Masters
- Hong Kong Baptist University
- Hong Kong Education City Limited
- Hong Kong Institute of Vocational Education
- Hong Kong New Emerging Technology Education Association
- Hong Kong New Generation Cultural Association
- Hong Kong Observatory
- Hong Kong Productivity Council
- Hong Kong Science and Technology Parks Corporation
- Hong Kong Science Museum
- Hong Kong Space Museum
- Hong Kong Statistical Society
- Hong Kong Technology Education Association
- Hong Kong Wetland Park
- Innovation and Technology Bureau

- Jockey Club Museum of Climate Change (MoCC)
- Kadoorie Farm & Botanic Garden
- Ocean Park Academy Hong Kong
- Our Hong Kong Foundation
- Sik Sik Yuen Biotechnology Mobile Laboratory
- STEM Initiative Hong Kong
- The Academy of Sciences of Hong Kong
- The Chinese University of Hong Kong
- The Education University of Hong Kong
- The Hong Kong Academy for Gifted Education
- The Hong Kong Association for Computer Education
- The Hong Kong Federation of Youth Groups
- The Hong Kong Institution of Engineers
- The Hong Kong Jockey Club Charities Trust
- The Hong Kong Polytechnic University
- The Hong Kong University of Science and Technology
- The Institution of Engineering and Technology (Hong Kong)
- The Open University of Hong Kong
- The University of Hong Kong
- The Women's Foundation
- Water Supplies Department
- World Wildlife Fund Hong Kong

Summary of Major Feedback on the Promotion of STEM Education

Items		Agreed & Strongly Agreed(%)
• STEM education as a key emphasis of the ongoing renewal of the school curriculum		91.4
• Two approaches for promoting STEM education	Learning activities based on topics of a KLA	90.5
	Projects to integrate relevant learning elements from different KLAs	81.0
• Six strategies to promote STEM education	(1) Renew the curricula of Science Education, Technology Education, Mathematics Education KLAs and primary General Studies	84.6
	(2) Enrich learning activities for students	93.1
	(3) Provide learning and teaching resources	95.5
	(4) Enhance professional development of schools and teachers	93.5
	(5) Strengthen partnerships with community key players	80.8
	(6) Conduct review and disseminate good practices	90.2

Remarks:

A questionnaire survey was conducted during the consultation on STEM education to collect views from Science, Technology and Mathematics Education KLA coordinators from all primary and secondary schools. [A total of 3 156 questionnaires were disseminated and 2 584 returns were received (with a response rate of 81.9%).]