For discussion **FCR(2016-17)82**
on 24 February 2017

ITEM FOR FINANCE COMMITTEE

HEAD 156 – GOVERNMENT SECRETARIAT:
EDUCATION BUREAU
Subhead 700 General non-recurrent
New Item "One-off grant to secondary schools for promotion of Science, Technology, Engineering and Mathematics education"

Members are invited to approve the creation of a new commitment of $102.6 million for a one-off grant to secondary schools for the promotion of Science, Technology, Engineering and Mathematics education.

PROBLEM

We need to step up the support to secondary schools[1] to enhance their promotion of Science, Technology, Engineering and Mathematics (STEM[2]) education.

PROPOSAL

2. The Secretary for Education proposes to create a new commitment of $102.6 million to provide each secondary school with a one-off grant of $200,000 (STEM grant) for the promotion of STEM education.

/JUSTIFICATION …..

[1] Secondary schools refer to government secondary schools, aided secondary schools (including special schools with secondary section), caput schools and secondary schools under the Direct Subsidy Scheme.

[2] STEM is an acronym that refers collectively to the academic disciplines of Science, Technology, Engineering and Mathematics.

JUSTIFICATION

Promotion of STEM education and support measures

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. It is envisioned that by cultivating students' learning interest, enhancing their capacity to innovate, and developing their creativity and problem solving skills through the promotion of STEM education, the potential of our students in innovation and versatile talents in the mathematics, science and technology fields would be unleashed while the international competitiveness of Hong Kong would be enhanced.

4. Since 2015, the Education Bureau (EDB) has implemented a series of support measures to promote STEM education, which include –

(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; and

(g) consulting stakeholders to collect feedback and suggestions on the way forward.

5. For details of the support measures (a) to (g) in paragraph 4 above, please refer to Annexes 1 to 7 of the Panel paper (LC Paper No. CB(4)79/16-17(01)). In addition, EDB released the Report on Promotion of STEM Education – Unleashing Potential in Innovation (the Report) in early December 2016. The Report sets out the final recommendations for promotion of STEM education in primary and secondary schools after the consultation conducted from late 2015 to early 2016. A summary of the recommendations is at Enclosure.

Encl.

Achievements of STEM education

6. Capitalising on their individual strengths and building on the interest of their students, schools have developed different programmes and activities for promoting STEM education. At the secondary level, STEM education is one of the curriculum emphases. Some schools have deployed existing resources to facilitate students' design of scientific investigation and realisation of their concepts in design-and-make projects, e.g. procuring kits for exploring biotechnology, building robots, programming single-board computers for sensing and controlling experiments, and writing mobile apps for science experiments. With such learning aids and facilities, schools have found students to be more motivated in learning and actively engaged in researching, discussing and collaborating closely with peers, producing innovative artefacts/designs and demonstrating self-confidence/competence in their learning.

7. Many schools have demonstrated remarkable achievements in different STEM-related projects and activities. Some schools have nominated students to participate in local, national and international competitions in relation to STEM and their performance has been very encouraging. Some of the awardees and participants in these activities/competitions have gone on to pursue studies in STEM-related programmes at post-secondary levels, or even set up related businesses. In addition, Hong Kong students have performed well in major international assessments in relation to STEM. In the latest reports on Progress in International Reading Literacy Study (2011), Trends in International Mathematics and Science Study (2015) and Programme for International Student Assessment (2015), Hong Kong students ranked among the top five in reading and mathematical literacy and top ten in scientific literacy. These are the strengths which STEM education is built on.

Need for additional funding support

8. To strengthen the promotion of STEM education, we see the need to provide additional funding support to all secondary schools for developing and organising school-based STEM-related programmes/activities or students' participation in STEM activities outside schools. In fact, similar resources were provided to primary schools in early 2016 to strengthen schools' capacity in planning and organising STEM-related activities. Some primary schools have made use of the grant to purchase equipment/resource materials or organise innovative learning activities. Primary schools welcomed the additional resources provided and found them helpful in facilitating their school-based initiatives on STEM education.

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9. We propose to provide a one-off STEM grant of $200,000 for each secondary school to strengthen our support to schools in promoting STEM education. With the provision of the STEM grant, it is expected that schools would have stronger incentive to keep up and/or enhance their existing school-based activities/projects on STEM education and kick-start new initiatives. Moreover, we expect that there would be wider participation of schools and students in STEM-related activities in partnership with different organisations and students would be more interested in pursuing further studies in STEM-related programmes at post-secondary level, or pursue vocational and professional education and training.

Ambit and use of grant

10. Recognising that STEM education targets at students of different backgrounds and capabilities, and that individual schools may have their own pace or preferred areas of development, schools can use the proposed grant flexibly to kick-start or enhance school-based STEM education in the following areas –

(a) to procure resources (e.g. teaching aids, consumables, learning and teaching resource materials), and upgrade some existing resources for the implementation of school-based STEM-related activities including projects and competitions;

(b) to organise STEM-related activities such as school-based scientific and technological activities/competitions; and

(c) to support students to participate in local, national and international STEM-related competitions/exhibitions/programmes.

11. The proposed grant is for the use across years from the 2016/17 school year till the end of the 2018/19 school year and the unspent provision by the end of 2018/19 will be clawed back. Schools should plan holistically for the use of the STEM grant flexibly together with their other resources.

Additional support from EDB

12. To facilitate the formulation of innovative activities, EDB will provide schools with relevant reference materials, e.g. a database consisting of projects and activities from local and different countries as well as related websites compiled and categorised according to levels of difficulty, complexity and

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appropriateness for different key stages of learning. EDB would also step up the support by providing STEM leadership training to school curriculum leaders to enhance their capacity in planning STEM education. Besides, we shall conduct school visits and surveys regularly to acquire first-hand information from schools on the use of the STEM grant and would collate and share examples on good use of the grant to schools through seminars, workshops and networking activities.

Accountability and monitoring mechanism

13. Schools are accountable for the use of the STEM grant. They are required to comply with the guidelines to be issued by EDB. The use of grant will also be subject to rigorous monitoring as other purpose-specific grants to schools, including reflecting the income and expenditure in the audited accounts to be submitted to EDB annually. Schools should keep a separate ledger account to record the income and expenditure of the grants, with breakdowns of the expenses. They should also make available such records and related receipts/invoices to EDB for inspection when required.

14. Schools will be required to evaluate the STEM programmes/activities and the use of the grant regularly and report to the Incorporated Management Committee/School Management Committee.

FINANCIAL IMPLICATION

15. The estimated expenditure for the proposed one-off STEM grant to secondary schools will be about $102.6 million. The estimated cash flow requirement from 2016-17 to 2019-20 is as follows –

Financial Year	**($ million)**
2016-17	96.4
2017-18	1.8
2018-19	2.6
2019-20	1.8
Total	**102.6**

16. We have included sufficient provision in the 2016-17 Estimates and will include the necessary provision in the draft Estimates of the relevant subsequent years for meeting the cost of this proposal.

PUBLIC CONSULTATION

17. On 14 November 2016, we briefed the Panel on Education about the promotion of STEM education in primary and secondary schools and consulted the Panel with the proposed grant. Members supported the proposal.

BACKGROUND

18. The promotion of STEM education in the territory aligns with the worldwide trend of equipping students for the rapid economic, scientific and technological developments, and the changes and challenges in society and around the world. The promotion of STEM education is built on the strengths of the local curriculum development and past experiences of schools.

19. The policy initiatives of promoting STEM education aims at further developing students to become lifelong learners of Science, Technology and Mathematics, enabling them to meet the challenges of the 21st century, and from a wider perspective, nurturing versatile talents with different levels of knowledge and skills for enhancing the international competitiveness of Hong Kong.

20. The major objectives of STEM education include developing a solid knowledge base among students and enhancing their interest in Science, Technology and Mathematics, strengthening their ability to integrate and apply knowledge and skills, nurturing their creativity, collaboration and problem solving skills, and developing talents/experts in STEM-related areas to facilitate the development of Hong Kong.

21. With STEM education highlighted as a key emphasis in the ongoing renewal of the school curriculum, schools are found to be more proactive in implementing STEM education. EDB will continue to strengthen the promotion of STEM education through a coherent and holistic approach with stepwise implementation of the final recommendations as elaborated in the Report in collaboration with schools and various community partners.

Education Bureau
February 2017

Enclosure to FCR(2016-17)82

Promotion of STEM[Note] Education

Final Recommendations

(a) Updating the curricula of the Key Learning Areas (KLAs) concerned to align with the ongoing renewal of the school curriculum with the focus on nurturing students' creativity, collaboration, problem solving skills and innovativeness through student-centred pedagogies, and on paving the way for nurturing students' entrepreneurial spirit in senior secondary school subjects such as Applied Learning courses;

(b) Strengthening the provision of quality learning experiences to students through support to schools on whole-school curriculum planning and collaboration with relevant organisations;

(c) Offering KLA-based and cross-KLA resource materials to schools to enhance learning and teaching on STEM-related areas and providing additional resources support for catering to their school-based needs;

(d) Strengthening the professional capacity, knowledge transfer and cross-fertilisation among schools and teachers for building communities of practice on STEM education;

(e) Synchronising the contributions from different community key players to enhance the promotion of STEM education in the territory; and

(f) Adopting actions to review the development of STEM education, consolidate the good practices for dissemination and generate knowledge for transfer.

(Please refer to the Report on STEM Education – Unleashing Potential in Innovation (available at EDB's website) for details about the actions for each recommendation.)

Note STEM is an acronym that refers collectively to the academic disciplines of Science, Technology, Engineering and Mathematics.