Ongoing Renewal of the School Curriculum: Briefing Session on Updating of Technology Education Key Learning Area Curriculum Guide (2017)

9, 11 May 2017
TE Section
Education Bureau
In response to the changing local, regional and global contexts and to maintain Hong Kong’s competitiveness, the school curriculum is being renewed to sustain and deepen its accomplishments achieved so far and to identify new emphases to focus on for the next five to ten years.

The ongoing renewal of the school curriculum continues to adopt and support a student-centred curriculum based on the guiding principles for the Learning to Learn curriculum reform since 2001, and aims to promoting whole-person development as well as nurturing lifelong and self-directed learning capabilities among students.

The curriculum guides of the eight Key Learning Areas (KLAs) are updated to incorporate corresponding renewals of the Basic Education curriculum Guide (Primary 1 – 6) (2014) and Secondary Education Curriculum Guide (Secondary 1 – 6) (2017) to facilitate planning and implementation of a whole-school curriculum by primary and secondary schools.
Objectives

• To introduce the background rationale and principles for the ongoing renewal of the school curriculum

• To report views and suggestions collected from stakeholder on the major updates of the Technology Education (TE) Key Learning Area (KLA) curriculum

• To brief on the major updates of the TE KLA Curriculum Guide and related support measures
Programme

• Introduction
  - Updating of the TE KLA Curriculum Guide

• Sharing and Discussion Session
  - Buddhist Ho Lam Kam Secondary School
  - Ling Liang Church M H Lau Secondary School

• Questions and Answers

- Teachers generally agreed (agreed and strongly agreed) with the major updates to be made in the TE KLA Curriculum guide

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrative learning and application skills of students through STEM education</td>
<td><strong>90.6%</strong></td>
</tr>
<tr>
<td>Generic skills, values education (including Basic Law education), language across the curriculum and information literacy</td>
<td><strong>75%</strong></td>
</tr>
<tr>
<td>e-Learning</td>
<td><strong>90%</strong></td>
</tr>
<tr>
<td>Holistic school-based Technology Education curriculum planning</td>
<td><strong>82.2%</strong></td>
</tr>
<tr>
<td>Catering for learner diversity</td>
<td><strong>87.9%</strong></td>
</tr>
</tbody>
</table>

- Teachers generally agreed (agreed and strongly agreed) with the principles, approaches and strategies of promoting STEM education

<table>
<thead>
<tr>
<th>The promotion of STEM education is introduced as a key emphasis of the ongoing renewal of the school curriculum. Its focus is to unleash students’ potential and develop their capacity to innovate by enhancing their creativity and problem-solving skills, as well as their interest in learning through integrating and applying knowledge and skills across disciplines of Science, Technology and Mathematics Education KLAs.</th>
<th>(92.8%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended approaches for organising STEM-related learning activities</td>
<td>(87.6%)</td>
</tr>
<tr>
<td>Learning activities based on topics of a KLA for students to integrate relevant learning elements from other KLAs</td>
<td></td>
</tr>
<tr>
<td>Projects for students to integrate relevant learning elements</td>
<td></td>
</tr>
<tr>
<td>Proposed strategies for promoting STEM education</td>
<td>(90.3%)</td>
</tr>
<tr>
<td>Renew the curricula of Science, Technology and Mathematics Education KLAs</td>
<td></td>
</tr>
<tr>
<td>Enrich learning activities for students</td>
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<tr>
<td>Provide learning and teaching resources</td>
<td></td>
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<tr>
<td>Enhance professional development of schools and teachers</td>
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<tr>
<td>Strengthen partnerships with community key players</td>
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<tr>
<td>Conduct review and disseminate good practices</td>
<td></td>
</tr>
</tbody>
</table>

| Areas that schools required support most | - Holistic curriculum planning  
- STEM education  
- Enhancing students’ technological literacy  
- Pedagogies  
- Catering for learner diversity |
|-----------------------------------------|--------------------------------------------------------------------------------|
| Support measures that could best address the needs and concerns of schools | - Professional development programmes  
- Resource packages  
- Online resources  
- School-based support |
| Teachers’ concerns | - Curriculum: contents, pedagogies, planning  
- Lesson time (insufficient)  
- Subject expertise  
- Interface  
- Workload  
- Support measures |
Learning to Learn 2+ - The Hong Kong School Curriculum

A broad and balanced curriculum with diversification and specialisations (choices) for academic, professional and vocational development according to students' needs

Nurturing lifelong & self-directed learning capabilities

Multiple pathways

Fostering whole-person development

SEVEN LEARNING GOALS

FIVE ESSENTIAL LEARNING EXPERIENCES

Moral and Civic Education
Intellectual Development
Community Service
Physical and Aesthetic Development
Career-related Experiences

Core Subjects
Chinese Language
English Language
Mathematics
Liberal Studies

Electives
20 Elective Subjects
Applied Learning
Other Languages

Other Learning Experiences
Moral and Civic Education
Aesthetic Development
Physical Development

Community Service
Career-related Experiences

Values & attitudes
Seven priority values
- Perseverance
- Respect for Others
- Responsibility
- National Identity
- Commitment
- Integrity
- Care for Others

Generic skills
Basic Skills
- Communication Skills
- Mathematical Skills
- IT Skills

Thinking Skills
- Critical Thinking Skills
- Creativity
- Problem Solving Skills

Personal & Social Skills
- Self-management Skills
- Self-learning Skills
- Collaboration Skills

Four Key Tasks: Towards major renewed emphases (MRE) at the JS level and beyond
STEM education & ITE, Values education (incl. MCE & Basic Law education), Language across the Curriculum (incl. reading), etc.
STEM Education & ITE

• The TE KLA contributes to the promotion of STEM education through:
  - developing among students a solid knowledge base and enhancing their interest in technology for future specialisation studies and careers;
  - strengthening students’ ability to integrate and apply knowledge and skills (including skills related to hands-on experiences) within and across the KLAs of Science, Technology and Mathematics Education;
  - fostering innovation in meeting the challenges of economic and technological development;
  - strengthening the collaboration among teachers in schools and the partnerships with community stakeholders.

• Information Literacy refers to the ability and attitude that would lead to an effective and ethical use of information. It aims to develop students’ abilities to:
  - identify the need for information
  - locate, evaluate, extract, organise and present information
  - create new ideas
  - cope with the dynamic in our information world
  - use information ethically and refrain from immoral practices such as cyber bullying, infringing intellectual property rights
Values Education

• The development process in technology involves a great deal of decision making to nurture students’ technological awareness through:
  - the choice of design to meet specific needs
  - the choice of materials for a specific design
  - the choice of process, tools, equipment to realise a design

• The decision-making process involves the assessment of constraints, cost effectiveness and the impact of sustainable development, such as:
  - an environment-friendly materials versus an increased cost
  - a highly automated process versus cutting jobs
  - Globalisation versus clustering of local economics
Language across the Curriculum (LaC)

Technology teachers can collaborate with the Chinese/English teachers to facilitate LaC through:

- identifying plan or schedule of work to facilitate transfer to Chinese/English language knowledge and relevant language skills
- developing learning, teaching and assessment materials, and activities that connect students’ learning experiences
- identifying common topics between the TE KLA and Chinese/English Language subjects
- exposing students to text types typical of the TE KLA (e.g. procedure/instructions)
- Teaching language features and rhetorical functions specific to TE KLA (e.g. providing reasons and explanations, stating causes and effects, comparing and contrasting, giving explanations)
TE KLA Curriculum Guide
- Aims

• TE curriculum aims

➢ Alignment of the TE curriculum aims with the updated 7 learning goals of the school curriculum

- Emphasising the development of technological literacy in students through the three TE strands
The curriculum framework is updated to include Key Stage 4.

The importance of interfaces in various key stages are emphasised.

Learning elements under the knowledge contexts were elaborated (ref: EDBCM 87/2013).

Major Renewed Emphases (MREs): e.g. STEM education & IT in Ed., Values Ed., etc.
TE KLA Curriculum Guide
- Curriculum Planning

• The importance of holistic curriculum planning as well as collaborations among teachers are emphasised

• TE is the entitlement of every students and 8% - 15% of the school’s total curriculum time is recommended for TE KLA at the junior secondary level

• TE KLA curriculum provides an open and flexible framework with 6 knowledge contexts

• There are core and extension learning elements. Core learning elements are suggested for all students.

• Different modes of TE curriculum implementation
  - Subject-based
  - Aligning subjects
  - Collaborative teaching of subjects
  - Theme-based learning
  - Life experiences of students
Collaborative teaching of subjects

<table>
<thead>
<tr>
<th>Characteristics and Facilitating Conditions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Team teaching to create more space for student learning</td>
<td>Integrated learning elements in Technology Subjects: Computer Control and Robotics</td>
</tr>
<tr>
<td>• Learning elements of different subjects clustered to form modules</td>
<td>- Students apply the knowledge acquired in “Programming Concepts” for designing the robots to perform different operation</td>
</tr>
<tr>
<td>• Cross-KLA studies</td>
<td>- Students apply the knowledge and skills in “Materials and Structures” and “Control for Automation” for working out the robot models</td>
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## Theme-based learning

<table>
<thead>
<tr>
<th>Characteristics and Facilitating Conditions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Themes used as platforms for organising learning experiences</td>
<td>• Establishing links between subjects (CL, D&amp;T, HEc/TL: Green Living)</td>
</tr>
<tr>
<td>• Cross-KLA studies</td>
<td>- Students are asked to explore issues of green design, green technology and green enterprise in response to related environmental concerns with examples provided by different subjects</td>
</tr>
<tr>
<td>• Life-wide learning</td>
<td>• Establishing links between KLAs (ME, SE, TE): Greenhouse</td>
</tr>
<tr>
<td>• Projects or coursework</td>
<td>- Students are requested to build a model of an environmental friendly greenhouse for which the user can create an environment with adjustable temperature/humidity to facilitate the growth of plants</td>
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</tbody>
</table>
TE KLA Curriculum Guide
- Highlights

• **Enriched Learning elements with updated learning content**
  ➢ 3D printing

• **Requirement of teaching Computer Programming**
  ➢ 30% of lesson time of ICT knowledge context is recommended for teaching programming

• **Updated examples**
  ➢ About 50 examples as well as learning and teaching activities are provided for schools’ reference
Learning Elements under Knowledge Contexts in Technology Education

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<tbody>
<tr>
<td>Computer Networks</td>
<td>Material Processing</td>
<td>Production Process</td>
<td>Resources Management</td>
<td>Application of Systems</td>
<td>Food Preparation &amp; Processing</td>
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<td>Control &amp; Automation</td>
<td>Family Living</td>
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</table>

Common Topics

- Technology & Society
- Safety & Health
- Information Processing & Presentation
- Design & Applications
- Consumer Education
<table>
<thead>
<tr>
<th>Knowledge contexts</th>
<th>Modules*</th>
<th>Learning objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information and Communication Technology (ICT)</td>
<td>K1 Computer Systems</td>
<td>Understand and apply ICT as a prime tool for learning and in our daily life</td>
</tr>
<tr>
<td></td>
<td>K2 Programming Concepts</td>
<td></td>
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<tr>
<td></td>
<td>K16 Information Processing and Presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E1 Computer Networks</td>
<td></td>
</tr>
<tr>
<td>Materials and Structures</td>
<td>K3 Materials and Resources</td>
<td>Understand the importance of materials and resources in the design process</td>
</tr>
<tr>
<td></td>
<td>K4 Structures and Mechanisms</td>
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<tr>
<td></td>
<td>E2 Material Processing</td>
<td></td>
</tr>
<tr>
<td>Operations and Manufacturing</td>
<td>K5 Tools and Equipment</td>
<td>Understand how to manage the resources and processes required to realise their design solutions</td>
</tr>
<tr>
<td></td>
<td>K6 Production Process</td>
<td></td>
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<td></td>
<td>E3 Project Management</td>
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<tr>
<td>Strategies and Management</td>
<td>K7 Business Environments, Operations and Organisations</td>
<td>Understand the concepts of business and management</td>
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<td></td>
<td>E4 Resources Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E5 Marketing</td>
<td></td>
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<tr>
<td>Systems and Control</td>
<td>K8 Concepts of System</td>
<td>Understand the concepts, applications and implications of both micro and macro systems</td>
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<tr>
<td></td>
<td>K9 Application of Systems</td>
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<td></td>
<td>E6 System Integration</td>
<td></td>
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<tr>
<td></td>
<td>E7 Control and Automation</td>
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<tr>
<td>Technology and Living</td>
<td>K10 Food and Nutrition</td>
<td>Understand how technology affects our lives and enhances the nurturing of quality people and quality homes</td>
</tr>
<tr>
<td></td>
<td>K11 Food Preparation and Processing</td>
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<td></td>
<td>K12 Fabric and Clothing Construction</td>
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<td>K13 Fashion and Dress Sense</td>
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<td>K14 Family Living</td>
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<td></td>
<td>K15 Home Management and Technology</td>
<td></td>
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<td></td>
<td>E8 Fabric and Clothing Construction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E9 Fashion and Dress Sense</td>
<td></td>
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<tr>
<td></td>
<td>E10 Home Management and Technology</td>
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</tbody>
</table>
8% of the Total Lesson Time for KS3 (220 hours)

<table>
<thead>
<tr>
<th>Level</th>
<th>Information and Communication Technology</th>
<th>Materials and Structures</th>
<th>Operations and Manufacturing</th>
<th>Strategies and Management</th>
<th>Systems and Control</th>
<th>Technology and Living</th>
</tr>
</thead>
</table>

Total lesson time for Secondary 1 - 3: 220 hours (13200)
### 15% of the Total Lesson Time for KS3 (413 hours)

<table>
<thead>
<tr>
<th>Level</th>
<th>Information and Communication Technology</th>
<th>Materials and Structures</th>
<th>Operations and Manufacturing</th>
<th>Strategies and Management</th>
<th>Systems and Control</th>
<th>Technology and Living</th>
</tr>
</thead>
</table>
| Secondary 1 (minutes) | • K1 Computer Systems (500)  
• K16 Information Processing and Presentation (1300) | • K5 Materials and Resources (320)  
• K4 Structures and Mechanism (320)  
• E2 Material Processing (320) | • K6 Tools and Equipment (320)  
• K6 Production Process (1520) | • K8 Concepts of System (80)  
• K9 Application of System (80) | • K10 Food and Nutrition (500)  
• K11 Food Preparation and Processing (660)  
• K12 Fabric and Clothing Construction (620)  
• K13 Fashion and Dress Sense (260)  
• K14 Family Living (120)  
• K15 Home Management and Technology (560)  
• E9 Fabric and Clothing Construction (80)  
• E9 Fashion and Dress Sense (80)  
• E10 Home Management and Technology (80) | |
| Secondary 2 (minutes) | • K2 Programming Concepts (480)  
• K16 Information Processing and Presentation (1200)  
• E3 Computer Networks (500) | • K5 Materials and Resources (200)  
• K4 Structures and Mechanism (800)  
• E2 Material Processing (320) | • K6 Tools and Equipment (280)  
• K6 Production Process (1200) | • K8 Concepts of System (40)  
• K9 Application of System (330) | • K10 Food and Nutrition (500)  
• K11 Food Preparation and Processing (660)  
• K12 Fabric and Clothing Construction (620)  
• K13 Fashion and Dress Sense (260)  
• K14 Family Living (120)  
• K15 Home Management and Technology (560)  
• E9 Fabric and Clothing Construction (80)  
• E9 Fashion and Dress Sense (80)  
• E10 Home Management and Technology (80) | |
| Secondary 3 (minutes) | • K2 Programming Concepts (1060)  
• K16 Information Processing and Presentation (480)  
• E3 Computer Networks (300) | • K5 Materials and Resources (120)  
• K4 Structures and Mechanism (200) | • K7 Business Environment, Operations and Organisations (1720)  
• E4 Resources Management (210)  
• E3 Marketing (150) | • K8 Concepts of System (40)  
• K9 Application of System (240) | • K10 Food and Nutrition (500)  
• K11 Food Preparation and Processing (660)  
• K12 Fabric and Clothing Construction (620)  
• K13 Fashion and Dress Sense (260)  
• K14 Family Living (120)  
• K15 Home Management and Technology (560)  
• E9 Fabric and Clothing Construction (80)  
• E9 Fashion and Dress Sense (80)  
• E10 Home Management and Technology (80) | |

**Total Lesson Time for Secondary 1 - 3: 413 hours (24780)**
Holistic Curriculum Development in the TE KLA

- Education trends
- School vision and mission
- Analysis of school context
- Students’ interests and abilities, and teachers’ expertise

Curriculum Emphases for Technology Education

- Secondary Education Curriculum Guide
- Technology Education KLA Curriculum Guide
- General Studies Curriculum Guide
- Curriculum and Assessment Guides for Technology Elective Subjects at the Senior Secondary Level

Holistic Curriculum Development Planning-Implementation-Evaluation
Collaboration among teachers (within the TE KLA and across other KLAs, e.g., planning STEM-related activities)

A school Technology Curriculum with Vertical Continuity and Lateral Coherence

Smooth Learning Progression from One Key Stage to Another

Students’ Solid Foundation in Technology

Resources & Support
- Learning and teaching resources
- Community resources
- School facilities & support
- Research & Development projects
- Professional development of school leaders and teachers
Support Measures for Planning, Learning and Teaching the TE curricula
Support measures

a) Learning and Teaching Resources
b) Professional Development Programmes
c) Grants
(a) Learning and Teaching Resources

**Junior Secondary (e.g.)**

- Implementation of the Enriched TE KLA Curriculum for Secondary 1 to 3 – Learning Element Modules related to **Design and Technology**
- Learning and teaching materials covering topics under the knowledge context of “**Strategies & Management**” with three topics, namely “Business Environments, Operations and Organisations” (Module K7), “Resources Management” (Module E4) and “Marketing” (Module E5)
- Unplugged Activities for Learning and Teaching of **Programming** (at upper primary and junior secondary levels)
- Learning and Teaching Resource Materials on **Basic Food Science**
(a) Learning and Teaching Resources

Senior Secondary (e.g.)

• The Simplified Version of Design and Applied Technology Learning and Teaching Resources at Senior Secondary Level

• Experimental Tests for Food and Textile in Technology and Living

• Topic-based Resources for Health Management and Social Care

• Modular-based Resources, Learning and Teaching Resources Kit for Business, Accounting and Financial Studies

• Teaching algorithm testing by using Scratch for Information and Communication Technology
(a) Learning and Teaching Resources

- The EDB Website – TE KLA

(a) Learning and Teaching Resources

- The EDB One-stop portal
  http://www.hkedcity.net/edbosp/
(a) Learning and Teaching Resources

- Technology Education KLA Resources Depository
  http://edblog.hkedcity.net/te
(a) Learning and Teaching Resources

- **STEM Education website**
  
  http://stem.edb.hkedcity.net/en/home/
(a) Learning and Teaching Resources

- **STEM Databank**
  
  **Sorted by Category and by Level**

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Titles / Activities</th>
<th>Level</th>
<th>Project Descriptions</th>
<th>Keywords / Terms</th>
<th>Source of Information / Weblinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Using STEM to “Go Green” and Defeat Global Warming</td>
<td>Pri</td>
<td>The project introduced engineering using green technology.</td>
<td>wind-turbine, renewable energy</td>
<td><a href="http://example.com">weblink</a></td>
</tr>
<tr>
<td>10</td>
<td>Design Amazing Flying Machine</td>
<td>Jr, SS</td>
<td>To design platforms</td>
<td><a href="http://example.com">weblink</a></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>各國青少年創意工程挑戰賽 - 翼龍機設計方案</td>
<td>JS, SS</td>
<td>For junior students, focus on design</td>
<td><a href="http://example.com">weblink</a></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Clamp and Click</td>
<td>SS</td>
<td>To design convenient photography</td>
<td><a href="http://example.com">weblink</a></td>
<td></td>
</tr>
</tbody>
</table>

**STEM projects from different countries**

**Major competitions and activities for students**

- 
  - SAFMC 2017
  - Cable Jointing Challenge
  - Star Events
  - Design Amazing Flying Machine
(b) Professional Development Programmes

- Understanding and Interpreting Curriculum / Curriculum Planning
- Learning and Teaching Strategies
- Knowledge Enrichment
- Assessment for Learning
- Sharing of Learning and Teaching Resources
- For the promotion of STEM Education
  - Symposia
  - Experience sharing sessions on STEM
  - Intensive training programmes for curriculum leaders and middle managers
(c) Grants

Recurrent Grant

- **Operating Expenses Block Grant (OEBG) / Extended Operating Expenses Block Grant (EOEBG) (EDBCM No.114/2016)**
  - Consolidated Subject Grant (綜合科目津貼)
  - Composite Furniture and Equipment Grant (綜合家具及設備津貼)
  - Composite Information Technology Grant (資訊科技綜合津貼)
Non-recurrent Grant

- **One-off Information Technology Grant for e-Learning in Schools (EDBCM No.185/2016)**
  在學校推動電子學習的一筆過資訊科技津貼

- **One-off STEM Grant**
  一筆過STEM津貼

*EDBCM No.31/2016 for Primary Schools and EDBCM No.68/2017 for Secondary Schools*

- To procure resources and/or upgrade some existing resources for the implementation of school-based STEM-related activities including projects and competitions;
- To organise STEM-related activities such as school-based scientific and technological activities/competitions; and
- To support students to participate in various STEM-related local, national and international competitions/exhibitions/programmes.
Thank You