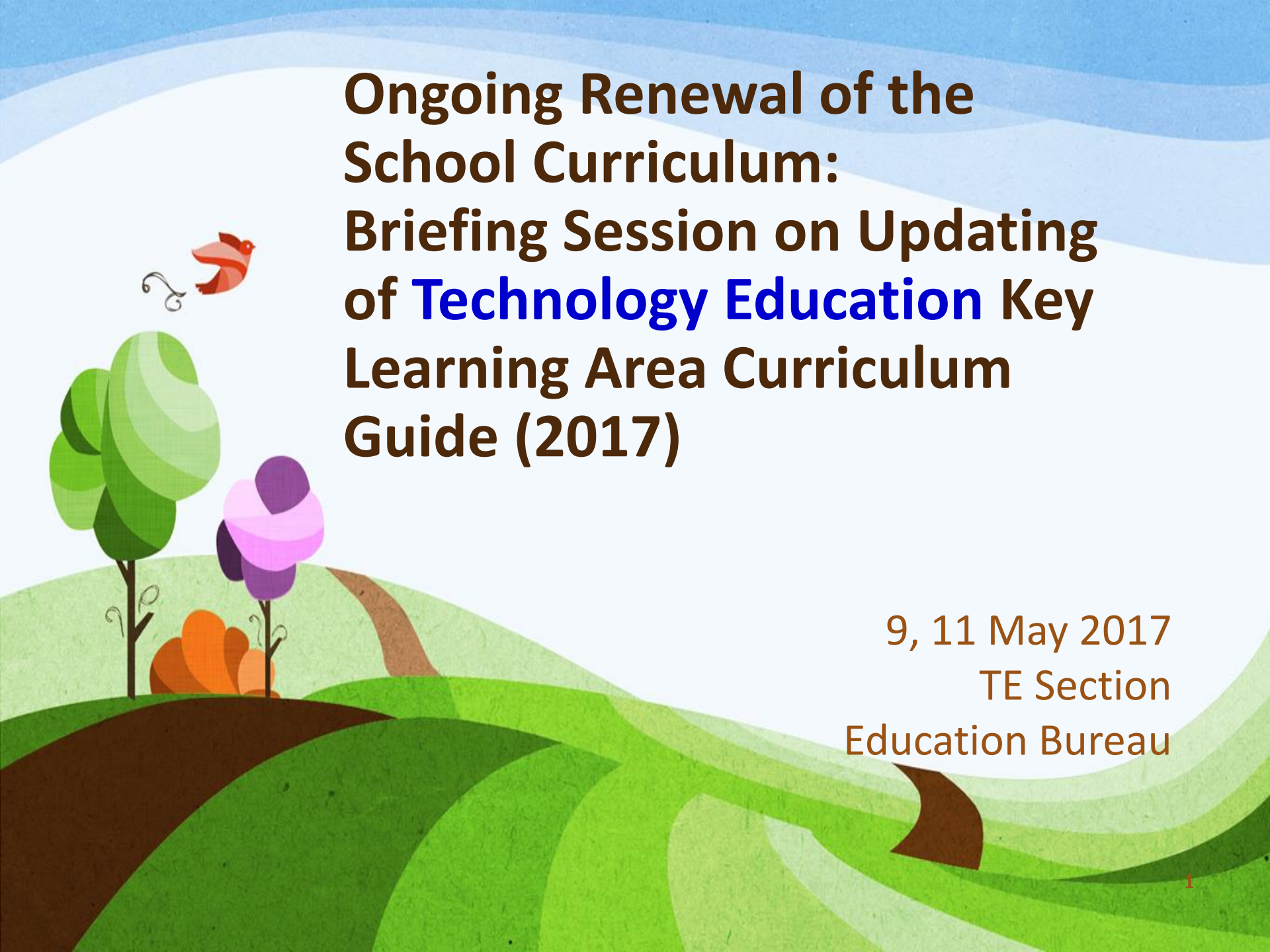
Ongoing Renewal of the School Curriculum: Briefing Session on Updating of Technology Education Key Learning Area Curriculum Guide (2017)



9, 11 May 2017
TE Section
Education Bureau

Background

- 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

Consultation Sessions and School Survey on the Updating of the TE KLA Curriculum Guide (Nov 2015 – Jan 2016)

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

• Integrative learning and application skills of students through STEM education	**(90.6%)**
• Generic skills, values education (including Basic Law education), language across the curriculum and information literacy	**(75%)**
• e-Learning	**(90%)**
• Holistic school-based Technology Education curriculum planning	**(82.2%)**
• Catering for learner diversity	**(87.9%)**

Consultation Sessions and School Survey on the Updating of the TE KLA Curriculum Guide (Nov 2015 – Jan 2016)

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

• 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.	**(92.8%)**
• Recommended approaches for organising STEM-related learning activities • Learning activities based on topics of a KLA for students to integrate relevant learning elements from other KLAs • Projects for students to integrate relevant learning elements	**(87.6%)**
• Proposed strategies for promoting STEM education • Renew the curricula of Science, Technology and Mathematics Education KLAs • Enrich learning activities for students • Provide learning and teaching resources • Enhance professional development of schools and teachers • Strengthen partnerships with community key players • Conduct review and disseminate good practices	**(90.3%)**

Consultation Sessions and School Survey on the Updating of the TE KLA Curriculum Guide (Nov 2015 – Jan 2016)

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

Life-wide Learning

SEVEN LEARNING GOALS

FIVE ESSENTIAL LEARNING EXPERIENCES

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

Secondary 4-6 — SS

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

Secondary 1-3 — JS

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.

Primary 1-6 — P

Chinese Language Education	English Language Education	Mathematics Education	Science Education	Technology Education	Personal, Social & Humanities Education	Arts Education	Physical Education
Key Learning Area	Key Learning Area	Key Learning Area	Key Learning Area	Key Learning Area	Key Learning Area	Key Learning Area	Key Learning Area

General Studies

Kindergarten 1-3 — KG

Values & attitudes, Skills and Knowledge

Language | Early Childhood Mathematics | Nature & Living | Self & Society | Arts & Creativity | Physical Fitness & Health

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

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

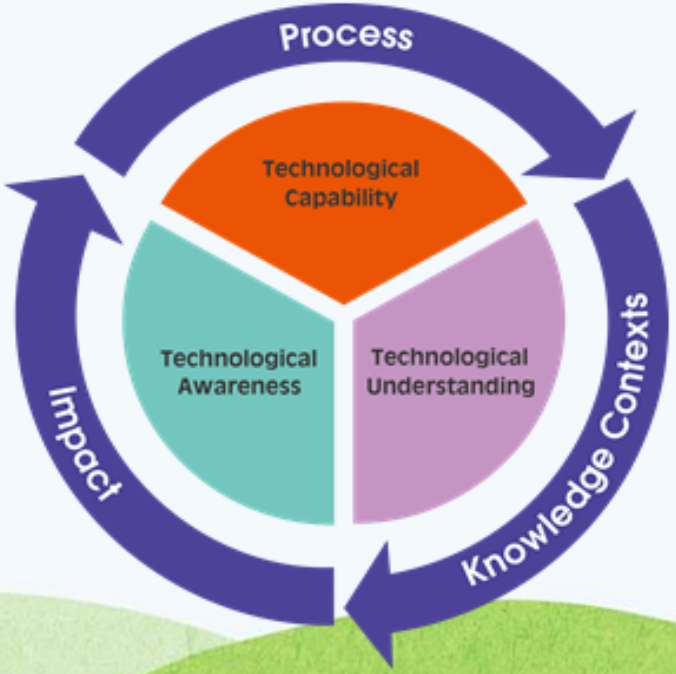
Language across the Curriculum (LaC)

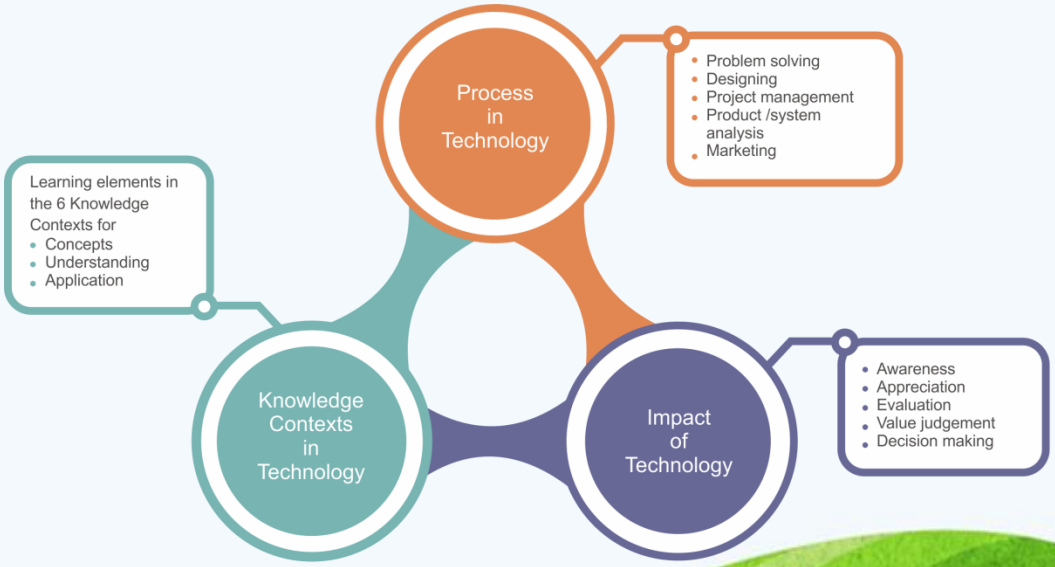
Technology teachers can collaborate with the Chinese/English teachers to facilitate LaC through:

- 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

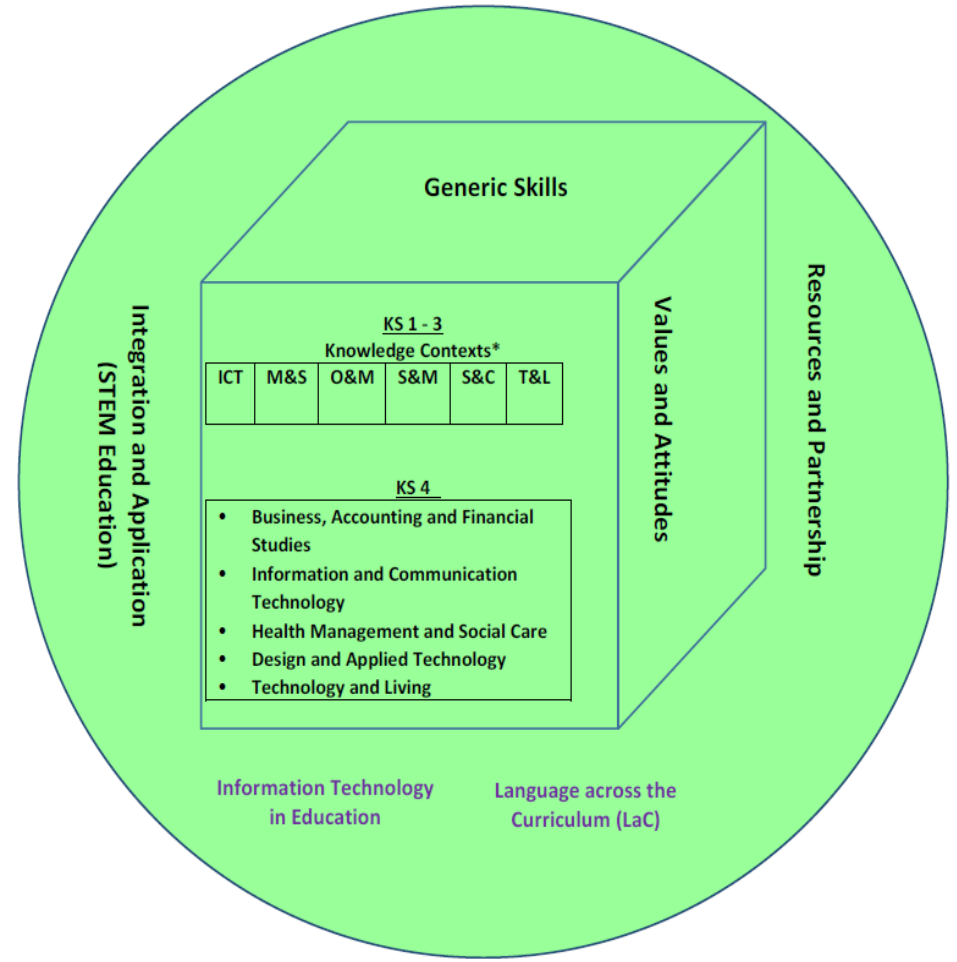




Connection among the Strands in TE

TE KLA Curriculum Guide - Framework

- 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

Characteristics and Facilitating Conditions	Examples
• Team teaching to create more space for student learning • Learning elements of different subjects clustered to form modules • Cross-KLA studies	Integrated learning elements in Technology Subjects: Computer Control and Robotics - Students apply the knowledge acquired in "Programming Concepts" for designing the robots to perform different operation - Students apply the knowledge and skills in "Materials and Structures" and "Control for Automation" for working out the robot models

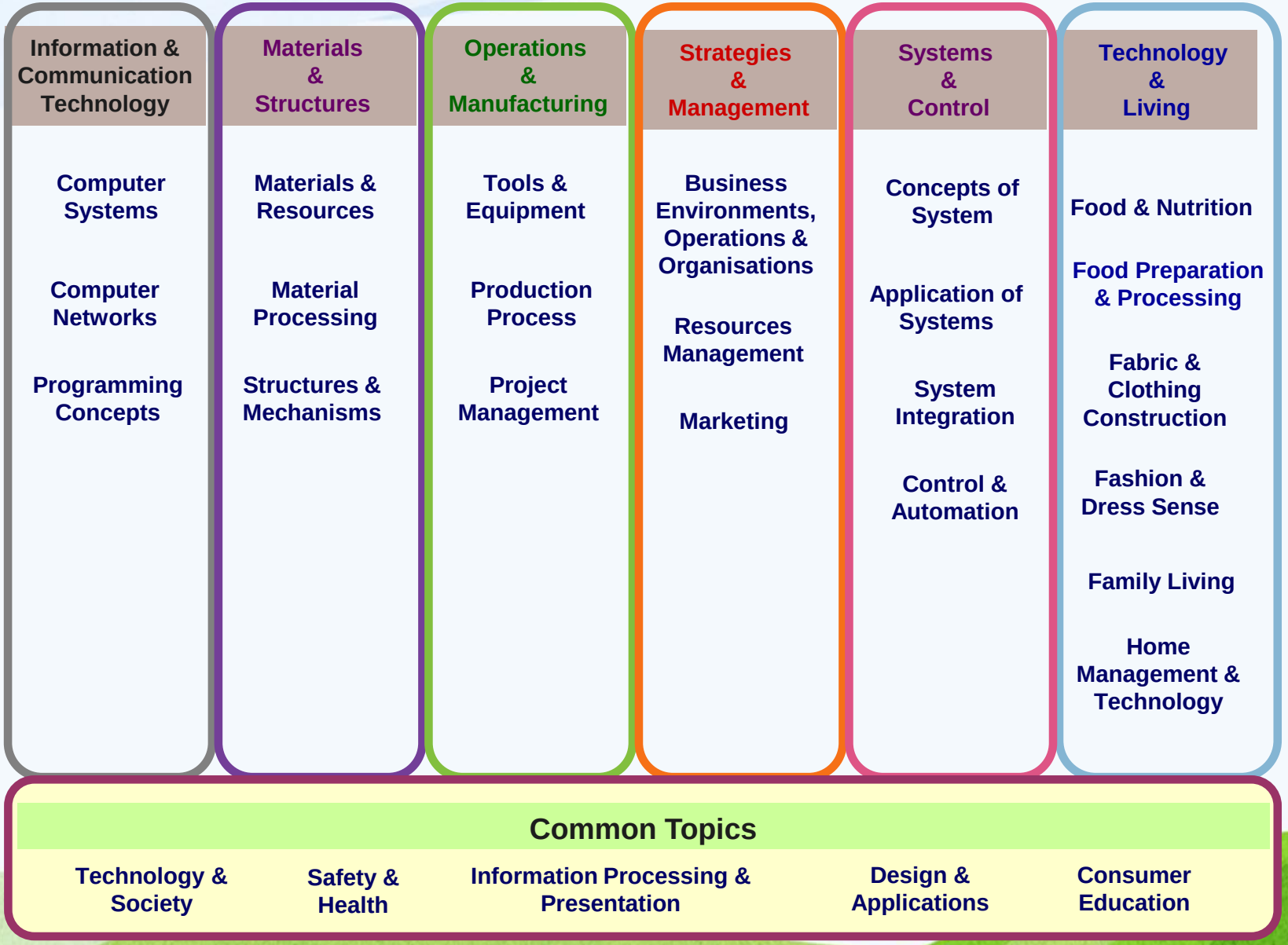
Theme-based learning

Characteristics and Facilitating Conditions	Examples
• Themes used as platforms for organising learning experiences • Cross-KLA studies • Life-wide learning • Projects or coursework	• Establishing links between subjects (CL, D&T, HEc/TL: Green Living - 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 • Establishing links between KLAs (ME, SE, TE): Greenhouse - 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

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



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

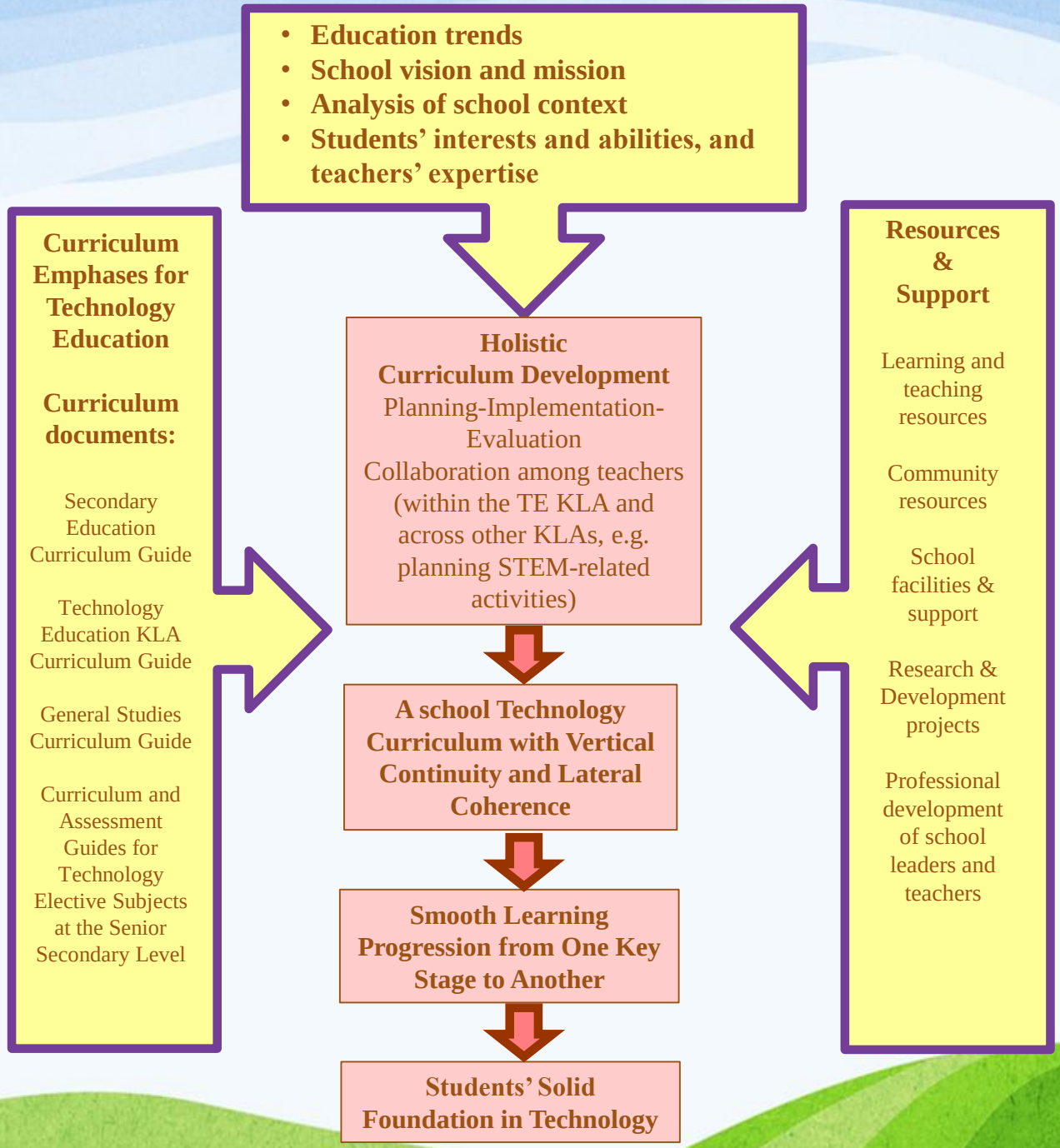
8% of the Total Lesson Time for KS3 (220 hours)

Level	Information and Communication Technology	Materials and Structures	Operations and Manufacturing	Strategies and Management	Systems and Control	Technology and Living
Secondary 1 (minutes)	• K1 Computer Systems (310) • K16 Information Processing and Presentation (730)	• K4 Structures & Mechanisms (320)	• K5 Tools and Equipment (160) • K6 Production Process (920)		• K8 Concepts of System (80) • K9 Application of Systems (80)	• K10 Food and Nutrition (300) • K11 Food Preparation and Processing (410) • K12 Fabric and Clothing Construction (410) • K13 Fashion and Dress Sense (120) • K14 Family Living (120) • K15 Home Management and Technology (200)
Secondary2 (minutes)	• K2 Programming Concepts (310) • K16 Information Processing and Presentation (730)	• K4 Structures and Mechanisms (600)	• K6 Production Process (600)		• K8 Concepts of System (40) • K9 Application of Systems (320)	• K10 Food and Nutrition (340) • K11 Food Preparation and Processing (310) • K12 Fabric and Clothing Construction (350) • K13 Fashion and Dress Sense (140) • K14 Family Living (120) • K15 Home Management and Technology (300)
Secondary 3 (minutes)	• K2 Programming Concepts (620) • K16 Information Processing and Presentation (420)	• K4 Structures and Mechanisms (200)	• K6 Production Process (1080)	• K7 Business Environments, Operations and Organisations (720)	• K8 Concepts of System (40) • K9 Application of Systems (240)	• K10 Food and Nutrition (300) • K11 Food Preparation and Processing (340) • K12 Fabric and Clothing Construction (360) • K13 Fashion and Dress Sense (140) • K14 Family Living (120) • K15 Home Management and Technology (300)
Total lesson time for Secondary 1 - 3: 220 hours (13200)						

15% of the Total Lesson Time for KS3 (413 hours)

Level	Information and Communication Technology	Materials and Structures	Operations and Manufacturing	Strategies and Management	Systems and Control	Technology and Living
Secondary 1 (minutes)	• K1 Computer Systems (600) • K16 Information Processing and Presentation (1380)	• K3 Materials and Resources (320) • K4 Structures and Mechanism (320) • E2 Material Processing (320)	• K5 Tools and Equipment (320) • K6 Production Process (1520)		• K8 Concepts of System (80) • K9 Application of Systems (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) • E8 Fabric and Clothing Construction (80) • E 9 Fashion and Dress Sense (80) • E10 Home Management and Technology (80)
Secondary 2 (minutes)	• K2 Programming Concepts (480) • K16 Information Processing and Presentation (1200) • E1 Computer Networks (300)	• K3 Materials and Resources (200) • K4 Structures and Mechanism (600) • E2 Material Processing (320)	• K5 Tools and Equipment (280) • K6 Production Process (1200)		• K8 Concepts of System (40) • K9 Application of Systems (320)	• K10 Food and Nutrition (500) • K11 Food Preparation and Processing (660) • K12 Fabric and Clothing Construction (600) • K13 Fashion and Dress Sense (260) • K14 Family Living (120) • K15 Home Management and Technology (580) • E8 Fabric and Clothing Construction (80) • E 9 Fashion and Dress Sense (80) • E10 Home Management and Technology (80)
Secondary 3 (minutes)	• K2 Programming Concepts (1000) • K16 Information Processing and Presentation (680) • E1 Computer Networks (300)	• K3 Materials and Resources (120) • K4 Structures and Mechanism (200)	• K5 Tools and Equipment (320) • K6 Production Process (1720) • E3 Project Management (320)	• K7 Business Environments, Operations and Organisations (720) • E4 Resources Management (210) • E5 Marketing (150)	• K8 Concepts of System (40) • K9 Application of Systems (240)	• K10 Food and Nutrition (500) • K11 Food Preparation and Processing (660) • K12 Fabric and Clothing Construction (600) • K13 Fashion and Dress Sense (260) • K14 Family Living (120) • K15 Home Management and Technology (580) • E8 Fabric and Clothing Construction (80) • E 9 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



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

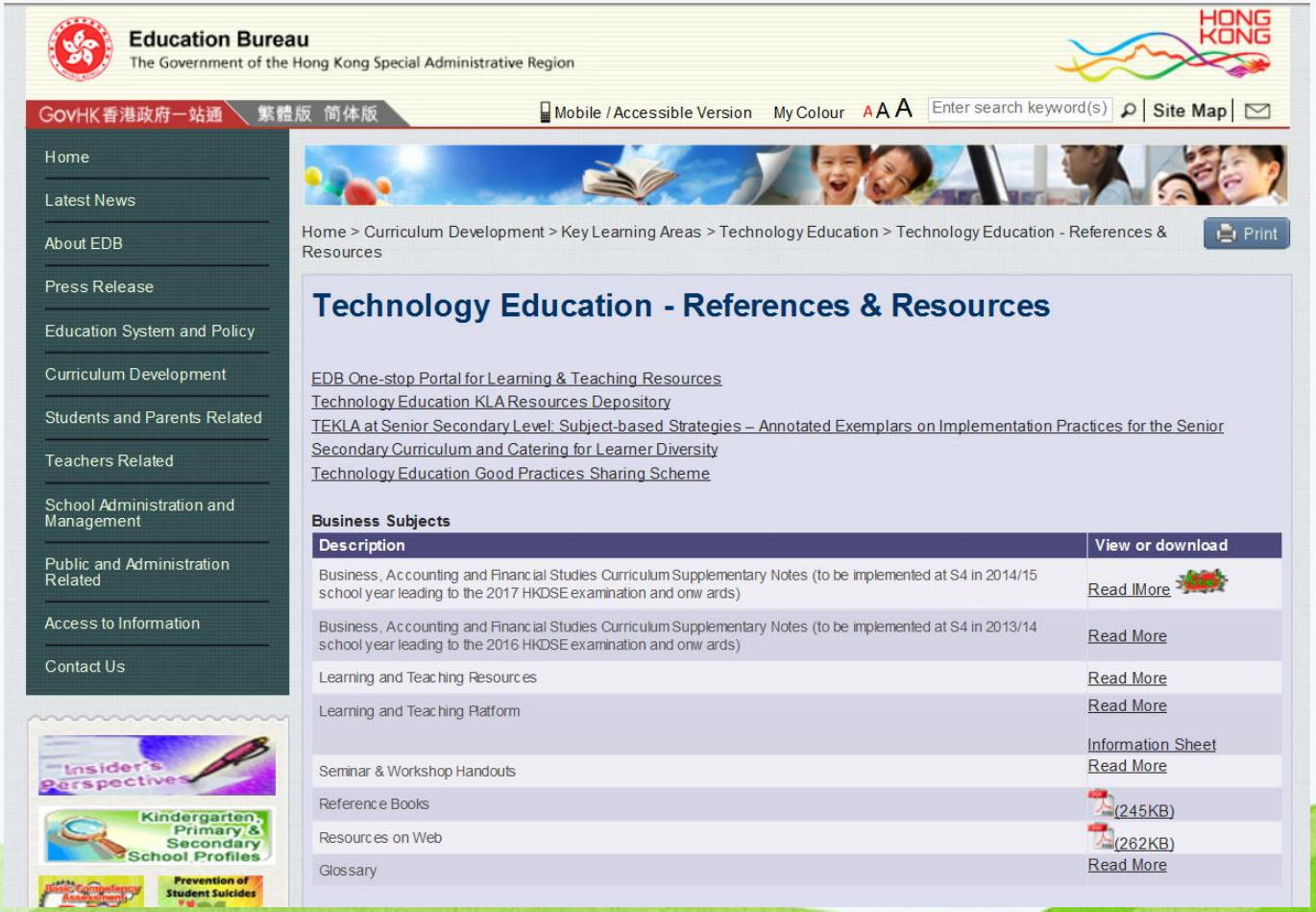
Senior Secondary (e.g.)

- 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**

http://www.edb.gov.hk/en/curriculum-development/kla/technology-edu/resources/index.html



(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/

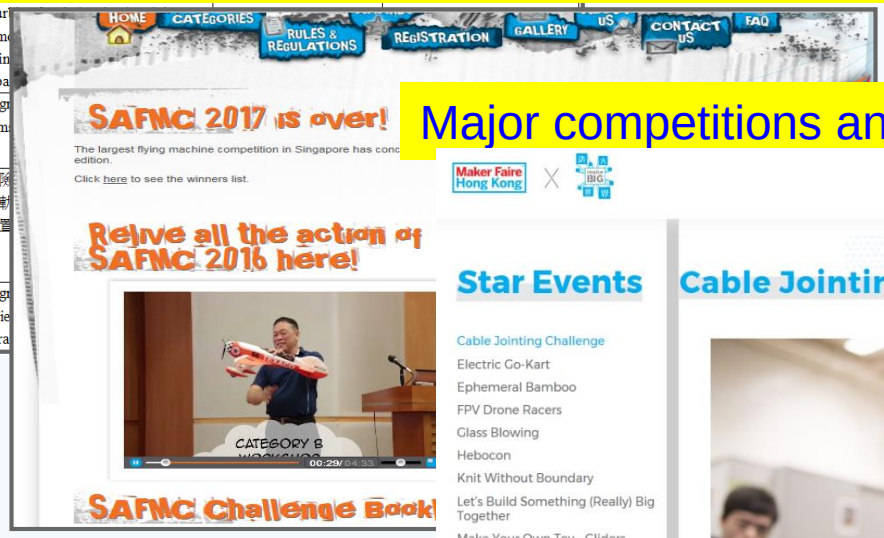
(a) Learning and Teaching Resources

- **STEM Databank**

Sorted by Category and by Level

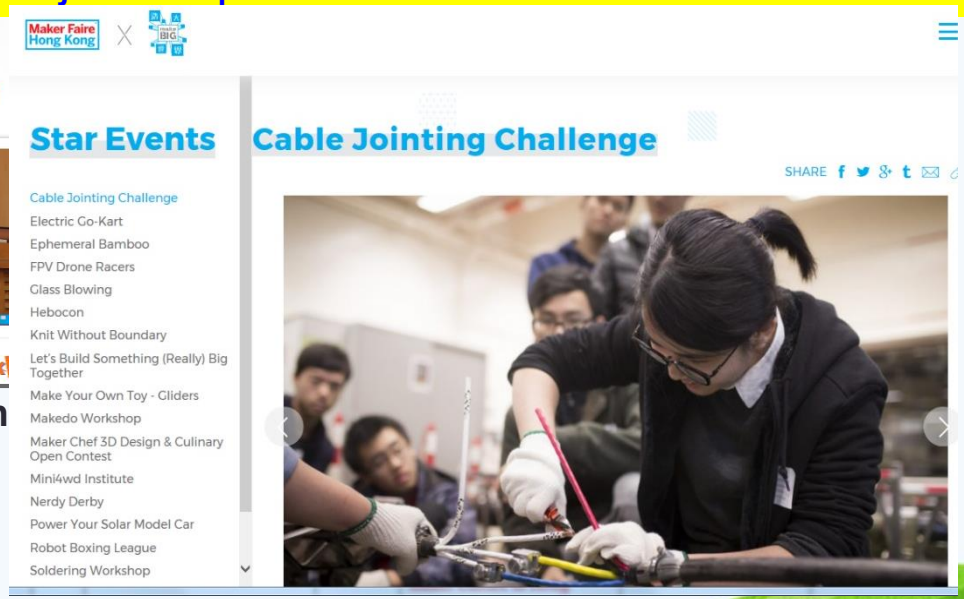
No.	Project Titles / Activities	Level	Project Descriptions	Keywords/Terms	Source of Information / Weblinks
i. Design and Make (#1-45)					
1	Using STEM to "Go Green" and Defeat Global Warming	Pri	The project introduced engineering using re in re wind-turi built a m the engin accompa	green technology, model	http://gogreenwithstem.wikis
10	Design Amazing Flying Machine	Pri, JS, SS	To design platform		
19	全國青少年創意工程挑戰賽 - 礦山歷險記設計方案	JS, SS	礦山歷險 平臺、軌 棘輪裝置 輪等。		
28	Clamp and Click	SS	To design convenie photogra		

STEM projects from different countries



Design Amazing Flyin

Major competitions and activities for students



(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