# 《設計與應用科技課程及評估指引 (中四至中六) – 補充資料》簡介會 (新辦)

# Briefing Session on the "Design and Applied Technology (DAT) Curriculum and Assessment Guide (Secondary 4 to 6) - Supplementary Notes" (New)

日期 Date ： 13/3/2021 (星期六 Saturday)

時間 Time ： 10:30 a.m. – 12: 00 noon

# 程序 Rundown

| 時間 Time | 內容 Content | 講者 Speaker(s) |
|---|---|---|
| 10:30 – 10:50 a.m. | ◆ 1. 編訂及發佈補充資料的背景、理念和原則 Background, rationales and principles for the preparation and issuance of the Supplementary Notes | 課程發展處科技教育組<br>課程發展主任<br>Curriculum Development Officer of Technology Education Section, CDI |
| 10:50 – 11:30 a.m. | ◆ 2. 介紹補充資料的內容 Introduction to the content of the Supplementary Notes<br>◆ 樣本試題 Sample examination questions | 資深考務人員<br>Experienced Examination Personnel |
| 11:30 – 11:40 a.m. | ◆ 3. 為學校提供的支援措施 Support measures for schools | 課程發展處科技教育組<br>課程發展主任<br>Curriculum Development Officer of Technology Education Section, CDI |
| 11:40 am – 12:00 noon | ◆ 4. 問答時段 Q&A Session | 課程發展處科技教育組和香港考試及評核局代表<br>Representative(s) of Technology Education Section, CDI and Assessment Development Division, HKEAA |

# 編訂及發佈補充資料的背景、理念和原則
# Background, rationales and principles for the preparation and issuance of the Supplementary Notes

# 背景 Background

- 課程發展議會─香港考試及評核局設計與應用科技委員會 (委員會) 自2019年初開始檢視在《設計與應用科技課程及評估指引（中四至中六）》中學習課題的涵蓋範圍。
  The Curriculum Development Council – Hong Kong Examinations Assessment Authority Committee on Design and Applied Technology (CDC-HKEAA Committee) has reviewed the coverage of the learning topics in the "Design and Applied Technology (DAT) Curriculum and Assessment (C&A) Guide (Secondary 4 to 6)" since early 2019.

- 委員會經過考慮相關研究建議、蒐集教師意見及在工作會議上作深入討論，建議使用補充資料來闡明其中四個學習課題的涵蓋範圍。
  After considering the suggestions from the related study, collecting views from teachers and in-depth deliberations in the working meetings, the CDC-HKEAA Committee proposed to use supplementary notes (Supplementary Notes) to clarify the coverage of four learning topics.

# 進程 Progress

| 日期 Date | 進程 Progress |
|---|---|
| 2019–2020 | 課程發展議會-香港考試及評核局設計與應用科技委員會草擬補充資料以闡明於設計與應用科技科課程中的四個學習課題所涵蓋的範圍<br>CDC - HKEAA Committee on DAT drafted the Supplementary Notes to clarify the coverage of four learning topics in the DAT Curriculum. |
| 9月Sep 2020 | 課程發展議會科技教育委員會通過補充資料<br>Curriculum Development Council Committee on Technology Education endorsed the Supplementary Notes. |
| 10月Oct 2020 | 課程發展議會通過補充資料<br>Curriculum Development Council endorsed the Supplementary Notes. |
| 12月Dec 2020 | 教育局通函(第188/2020號)向學校公布有關補充資料事宜<br>A Circular Memorandum (CM No. 188/2020) was issued to schools to announce the issuance of the Supplementary Notes. |
| **9月 Sep 2022 以後 onwards** | • **《設計與應用科技課程及評估指引（中四至中六）》中的課程和評估架構則維持不變。**<br>**The curriculum and assessment frameworks in the DAT C&A Guide remain unchanged.**<br>• 補充資料將**由2022/23學年起在中四級實施，並在2025年及以後的香港中學文憑考試生效。**<br>The Supplementary Notes will be implemented **at Secondary 4 starting from the 2022/23 school year, leading to the 2025 HKDSE examination and thereafter.** |

# 教育局通函 EDB Circular Memorandum

教育局通函(第188/2020號)於2020年12月30日發布。
EDB CM No. 188/2020 was issued on 30 Dec 2020.

- 中文版 Chinese version:
  - https://www.edb.gov.hk/attachment/tc/curriculum-development/renewal/CM/EDBCM20188C.pdf

- 英文版 English version:
  - https://www.edb.gov.hk/attachment/en/curriculum-development/renewal/CM/EDBCM20188E.pdf

# 補充資料 Supplementary Notes

補充資料已上載至教育局網頁供教師參考。

The Supplementary Notes have been uploaded to the EDB website for teachers' reference.

- 中文版 Chinese version:
  - https://www.edb.gov.hk/attachment/tc/curriculum-development/kla/technology-edu/curriculum-doc/DAT_C&A_Supplementary_notes_CHI_Dec_2020.pdf

- 英文版 English version:
  - https://www.edb.gov.hk/attachment/en/curriculum-development/kla/technology-edu/curriculum-doc/DAT_C&A_Supplementary_notes_ENG_Dec_2020.pdf

# 目的 Aim

補充資料旨在闡明於設計與應用科技科課程內四個學習課題所涵蓋的範圍：
**The Supplementary Notes aim to clarify the requirement on coverage of four learning topics in the DAT Curriculum:**

- 必修部分：學習範疇二 – 科技原理
  **Compulsory part: Strand 2-Technological Principles**; and
- 選修部分：單元三 – 設計實踐及材料處理
  **Elective part: Module 3 -Design Implementation & Material Processing**.

四個學習課題的涵蓋範圍包括 The four topics include:

- 材料 **Materials;**
- 機械組織 **Mechanisms;**
- 標準元件 **Standard components and;**
- 生產／製作程序 **Manufacturing/fabrication processes.**

# 設計與應用科技課程及評估指引（中四至中六）2015 (摘錄)
# DAT C&A Guide (S4-6) 2015 (extract)

設計與應用科技課程及評估指引 (學習範疇二 — 科技原理), p.15-16
DAT C&A Guide ( Strand 2 Technological Principles), p.15-16

| 課題<br>*學生應可學習到* | 成果<br>*學生應能* | 說明 |
|---|---|---|
| **科技的本質**<br>• 創新與科技<br>• 能量與能源<br>• 材料及標準元件 | 18. 了解科技的本質<br>19. 了解能量來源及天然資源系統<br>20. 了解操作產品時的能源消耗及對設計的影響<br>21. 了解常用材料的性質 | • 從宏觀的角度講解發明和創新（例如八達通系統）<br>• 解釋創新與發明、科學與科技的分別<br>• 工程產品的個案研究：分析一輛單車及其系統（例如能源轉換、傳動和控制系統）、使用的材料和製造程序<br>• 考慮使用產品時所需用的能源（例如能量的來源包括可再生能源、效率、變換、動力和能量、消耗、浪費、節約）<br>• 探索並描述材料的性質（例如物質的結構、結合、應力及應變）包括塑膠/木材/金屬/陶器<br>• 討論有關「善用材料」的議題<br>• 使用合適的材料和標準元件來設計及製造產品（例如螺栓及螺帽）<br>• 解說飲料的包裝材料的使用情況（例如原材料、處理、銷售形式、再循環、優化資源開發、政府政策） |

就「材料」作進一步闡述
Further elaboration on "Materials"

| Topics<br>*Students should learn* | Outcomes<br>*Students should be able to* | Explanatory notes |
|---|---|---|
| **Nature of technology**<br>• Innovation and technology<br>• Energy and energy resources<br>• Materials and standard components | 18. Understand the nature of technology<br>19. Understand the systems of energy sources and natural resources<br>20. Understand energy consumption in the operation of products and its impact on design<br>21. Understand the properties of commonly used materials | • Describe broad perspectives of invention and innovation (e.g. Octopus system)<br>• Explain the difference between innovation and invention, and science and technology<br>• Case study of engineering products: Analyse a bicycle and its systems (e.g. energy conversion, transmission and control systems), materials used, and manufacturing processes<br>• Consider the use of energy in operation of products (e.g. sources of energy, including renewable energy, efficiency, conversion, power and energy, consumption, waste and conservation)<br>• Explore and describe material properties (e.g. the structure of matter, bonding, and stress and strain) of plastics/ wood/ metal/ ceramic<br>• Discuss issues related to maximising the use of materials<br>• Design and make products using appropriate materials and standard components (e.g. bolt and nut)<br>• Account for material use in beverage containers (e.g. raw material, process, market form, recycling, optimising resource exploitation, and government policy) |

# 設計與應用科技課程及評估指引（中四至中六）2015 (摘錄)
# DAT C&A Guide (S4-6) 2015 (extract)

## 設計與應用科技課程及評估指引 (學習範疇二 – 科技原理), p.15-16
## DAT C&A Guide ( Strand 2 Technological Principles), p.15-16

| 課題<br>*學生應可學習到* | 成果<br>*學生應能* | 說明 |
|---|---|---|
| **生產程序**<br>• 健康和工業安全<br>• 工具、設備及機械<br>• 製造系統 | 22. 考慮工作間的安全預防措施<br>23. 選擇及使用合適的工具和設備<br>24. 執行合適的製作程序<br>25. 了解不同的製造系統 | • 解說安全措施（例如工作間的安全、規則和條例、行業守則）以避免工傷意外<br>• 應用適當的工具於材料加工，包括成形（例如銼削和鍛造）、接合（例如鉚接和上螺釘），機器加工（例如鑽孔、車削、鐳射切割，真空成形）和表面處理（例如塗層、上漆）<br>• 解釋各種製造系統（例如單一生產，批量生產和大量生產） |
| **系統及控制**<br>• 輸入－處理－輸出<br>• 邏輯門<br>• 機械系統<br>• 實體結構<br>• 基本電子學 | 26. 了解各種系統及控制的模式<br>27. 利用方塊圖顯示控制系統<br>28. 詮釋簡單邏輯門的真值表<br>29. 應用機械概念知識於設計、製作、及控制系統<br>30. 了解力學的本質及結構的穩定性<br>31. 了解電子系統的基本原理 | • 解釋家居電器（例如風筒、洗衣機）的輸入、處理及輸出<br>• 辨別在一個集體交通運輸系統內的附屬系統（例如在地鐵系統內的機械、電子、氣動系統）<br>• 認知簡單邏輯門（例如「或」、「及」、「非」門）的工作原理<br>• 設計一個機械玩具時，建議合適類型的控制、傳輸系統和運動變換（例如連杆、凸輪和隨動件、滑塊曲柄機構、齒條和齒輪、棘輪和棘爪）<br>• 考慮結構的強度和穩定性，建議產品的形狀和形體<br>• 利用電子學習套件，認知簡單的電子控制及其介面 |

就「生產／製作程序」作進一步闡述
Further elaboration on "Manufacturing / fabrication processes"

就「機械組織」作進一步闡述
Further elaboration on "Mechanisms"

| Topics<br>*Students should learn* | Outcomes<br>*Students should be able to* | Explanatory notes |
|---|---|---|
| **Production process**<br>• Health and industrial safety<br>• Tools, equipment and machineries<br>• Manufacturing systems | 22. Consider safety precautions in the workplace<br>23. Select and use appropriate tools and equipment<br>24. Execute appropriate fabrication processes<br>25. Understand different manufacturing systems | • Account for safety measures (e.g. workshop safety, rules and regulations, and codes of practice) to safeguard people from injury<br>• Apply appropriate tools in the shaping (e.g. filing and forging), joining (e.g. riveting and screwing), machining (e.g. drilling, turning, laser cutting and vacuum forming) and finishing (e.g. coating and painting) of materials<br>• Explain various manufacturing systems (e.g. one-off, batch, and mass production) |
| **Systems and control**<br>• Input-Process-Output<br>• Logic gates<br>• Mechanical systems<br>• Physical structure<br>• Basic electronics | 26. Understand various forms of system and control<br>27. Illustrate control systems with block diagrams<br>28. Interpret truth tables for simple logic gates<br>29. Apply knowledge/ concepts of mechanics in design, fabrication and control of systems | • Explain the input, process and output of appliances (e.g. hair dryer and washing machine)<br>• Identify the sub-systems in a mass transit system (e.g. mechanical, electronic, and pneumatic systems in the Mass Transit Railway)<br>• Appreciate the working principles of simple logic gates (e.g. OR, AND and NOT)<br>• Propose suitable types of control, transmission systems and motion conversion (e.g. linkage, cam and follower, slider crank, rack and pinion, and ratchet and pawl) in designing a mechanical toy |

# 設計與應用科技課程及評估指引（中四至中六）2015 (摘錄)
# DAT C&A Guide (S4-6) 2015 (extract)

## 設計與應用科技課程及評估指引 (單元三 – 設計實踐及材料處理), p.25
## DAT C&A Guide (Module 3 Design Implementation and Material Processing), p.25

| 課題<br>*學生應可學習到* | 成果<br>*學生應能* | 說明 |
|---|---|---|
| 材料、元件及系統<br>• 材料的特性和選擇<br>• 材料及結構<br>• 機械組織<br>• 新興材料 | 1. 了解材料和元件的選擇會受材料本質和工作特性影響<br>2. 了解材料的強度，並為系統設計合適的結構<br>3. 懂得在控制系統內使用機械組織<br>4. 認識新興材料的應用 | • 在設計、製作和控制等個別層面上，探索各種材料的應用（例如分類、加工性能、質量、選擇和測試、標準組件等）<br>• 探索物料的選擇如何影響設計<br>• 應用結構強度和硬度的概念（例如安全系數、簡單運算：材料的楊氏模量、在平衡結構中各組成部分的負載、簡單承托橫樑和懸臂的彎矩與剪力圖）進行設計<br>• 利用簡單運算方式計算一個機械系統的機械利益、速度比、效率及扭矩<br>• 透過研究和探索，研習在工業生產上應用現代化和智慧型材料（例如太陽電池板、保溫陶瓷、液晶體顯示、碳纖維、納米材料、形狀記憶合金） |

就「材料」、「標準元件」及「機械組織」作進一步闡述
Further elaboration on **"Materials"**, **"Standard Components"** and **"Mechanisms"**

| Topics<br>*Students should learn* | Outcomes<br>*Students should be able to* | Explanatory notes |
|---|---|---|
| **Materials, components and systems**<br>• Properties and choice of materials<br>• Materials and structures<br>• Mechanisms<br>• New materials | 1. Understand that properties and working characteristics influence the choice of materials and components<br>2. Understand the strength of material and design appropriate structures in a system<br>3. Apply mechanisms for control systems<br>4. Understand the use of new materials | • Explore various materials for particular applications in design, fabrication and control (e.g. classification, working properties, quality, selection and testing, and standard components)<br>• Explore how the choice of materials affects a design<br>• Apply the concept of strength and stiffness of structure in design (e.g. safety factors, simple calculations: Young's modulus of a material, loads experienced by the members of a structure in equilibrium, and bending moment and shear force diagrams of simply supported beams and cantilevers)<br>• Apply simple calculations to determine the mechanical advantage (M.A.), velocity ratio (V.R.), efficiency and torque of a mechanical system<br>• Study the use of modern and smart materials (e.g. solar panels, thermo-ceramics, liquid crystal displays (LCD), carbon fibres and nano-materials, and shape memory alloys) in industry through research and exploration |

# 設計與應用科技課程及評估指引（中四至中六）2015 (摘錄)
# DAT C&A Guide (S4-6) 2015 (extract)

設計與應用科技課程及評估指引 (單元三 – 設計實踐及材料處理), p.25
DAT C&A Guide (Module 3 Design Implementation and Material Processing), p.25

| 課題<br>*學生應可學習到* | 成果<br>*學生應能* | 說明 |
|---|---|---|
| **生產程序及製造**<br>• 製造程序及技術<br>• 生產規模<br>• 質量保證與質量控制 | 5. 挑選、解釋及執行適當的製造程序與技術<br>6. 解釋在何種情況下最適合使用不同的生產規模<br>7. 考慮在生產過程中應用質量控制 | • 建議適合的製造程序（例如人手或自動化、夾具、刀具、機械及儀器、構成作業、成形及模塑、表面處理）<br>• 根據對生產程序的分析，推論為何及如何製造產品（例如單一/批量/大量生產）<br>• 利用個案，分析具結構管理的質量製造程序（例如質量保證、質量控制、準確性和容限度、及生產的質量標準） |

就「生產／製作程序」作進一步闡述
Further elaboration on **"Manufacturing / fabrication processes"**

| Topics<br>*Students should learn* | Outcomes<br>*Students should be able to* | Explanatory notes |
|---|---|---|
| **Processing and manufacturing**<br>• Manufacturing processes and techniques<br>• Scale of production<br>• Quality assurance and quality control | 5. Select, explain and execute appropriate manufacturing processes and techniques<br>6. Explain when it is most appropriate to use different scales of production<br>7. Consider the application of quality control in production | • Suggest appropriate manufacturing processes for production (e.g. manual or automated, jig and fixture, tools, machinery and equipment, fabrication processes, forming and moulding, and finishing processes)<br>• Deduce from production analysis how and why products are manufactured (e.g. using one off / batch / mass production)<br>• Study, as in a case, a structured management process for quality manufacturing (e.g. quality assurance, quality control, accuracy and tolerances, and quality standards in production) |

# 理念和原則 Rationales and Principles

補充資料中所列項目的甄選標準包括：

The criteria for selection of the items in the Supplementary Notes include:

1. **科本基礎知識的需要 Need for the subject-based fundamental knowledge**
2. **產品設計及製作過程的應用 Application for Design and Make process of products**
3. **於本地環境可及性 Accessibility in local context**
4. **可持續性 Sustainability**

# 例子 Examples (1)

在[ ]外所列出的項目（附藍色標記）：

Items listed without [ ] (in blue highlight) :

- 參照《設計與應用科技課程及評估指引》相關部分所指定的理解水平要求

  requirements on the level of understanding specified in the respective part of the DAT C&A guide

| 課題 | 項目 |
|---|---|
| **材料** | • **木材**<br>軟木：松木、杉木、[柏木]<br>硬木：飛機木、櫸木、樺木、橡木、山樟、柚木、白楊木、[櫻桃木、桃花心木、胡桃木]<br>人造板材：大芯夾板、刨花板、中密度纖維板 (MDF)、夾板<br>• **金屬**<br>含鐵金屬及合金：鑄鐵、碳鋼、軟鋼、不銹鋼、鍍鋅鋼、[高速鋼、工具鋼]<br>非含鐵金屬及合金：鋁、黃銅、青銅、紅銅、鉛、錫、鋅、[杜拉鋁、碳化鎢]<br>• **聚合物**<br>熱塑性塑料：丙烯腈-丁二烯-苯乙烯共聚物 (ABS)、亞加力／聚甲基丙烯酸甲酯 (PMMA)、尼龍／聚醯胺 (PA)、聚對苯二甲酸乙二酯 (PET)、聚丙烯 (PP)、聚苯乙烯 (PS)、發泡膠／泡沫聚苯乙烯 (EPS)、高密度發泡膠／擠塑聚苯乙烯 (XPS)、聚氯乙烯 (PVC)、[高密度聚乙烯 |

| Topics | Items |
|---|---|
| **Materials** | • **Woods**<br>Softwoods: pine, spruce, [cedar]<br>Hardwoods: balsa, beech, birch, oak, san cheong, teak, poplar, [cherry, mahogany, walnut]<br>Manufactured boards: blockboard, particle board, medium-density fibreboard (MDF), plywood<br>• **Metals**<br>Ferrous and its alloys: cast iron, carbon steel, mild steel, stainless steel, galvanised steel, [high speed steel, tool steel]<br>Non-ferrous and its alloys: aluminium, brass, bronze, copper, lead, tin, zinc, [duralumin, tungsten carbide]<br>• **Polymers**<br>Thermoplastics: acrylonitrile butadiene styrene (ABS), acrylic/polymethyl methacrylate (PMMA), nylon/polyamide (PA), polyethylene terephthalate (PET), polypropylene (PP), polystyrene |

# 例子 Examples (1)

1. 科本基礎知識的需要

2. 產品設計及製作過程的應用

**材料 :** 夾板, 不銹鋼, 聚氯乙烯 (PVC), 卡紙板

**機械組織:** 凸輪和隨動件, 連桿, 帶和滑輪

**標準元件:** 螺栓及螺帽, 螺釘, 鉚釘

**生產／製作程序:** 硬焊和軟焊, 真空成形, 拋光, 鐳射切割

3. 於本地環境可及性

4. 可持續性

1. Need for the subject-based fundamental knowledge

2. Application for Design and Make process of products

**Materials :** plywood, stainless steel, PVC, cardboards

**Mechanisms:** cam and follower, linkages, belts and pulleys

**Standard component:** bolts and nuts, screws, rivets

**Manufacturing/fabrication processes:** hard and soft soldering, vacuum forming, polishing, laser cutting

3. Accessibility in local context

4. Sustainability

# 例子 Examples (2)

在[ ]內所列出的項目（附黃色標記）：

Items listed within [ ] (in yellow highlight) :

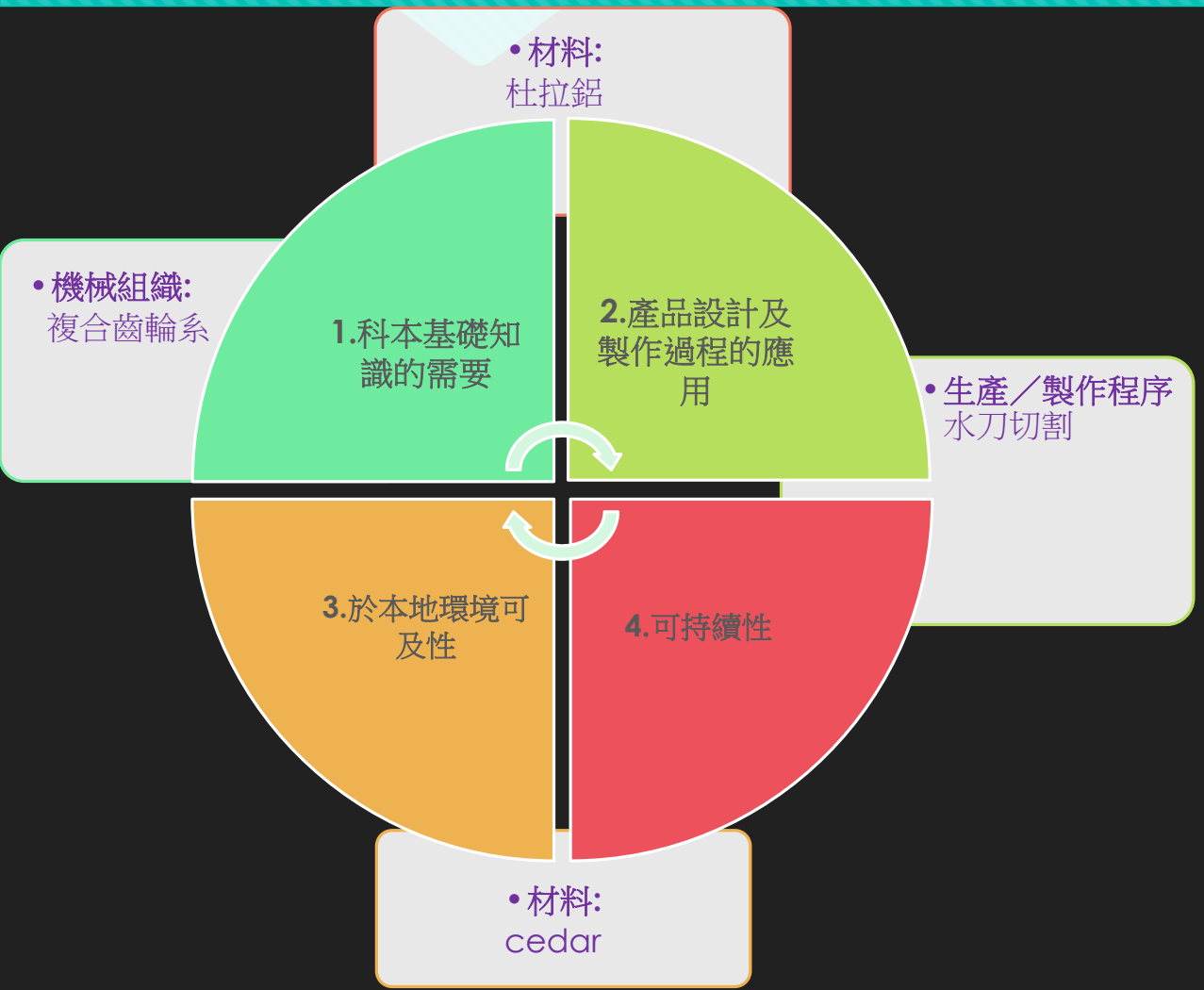
- 只需指出其名稱及意識到其於設計和製造過程中的應用

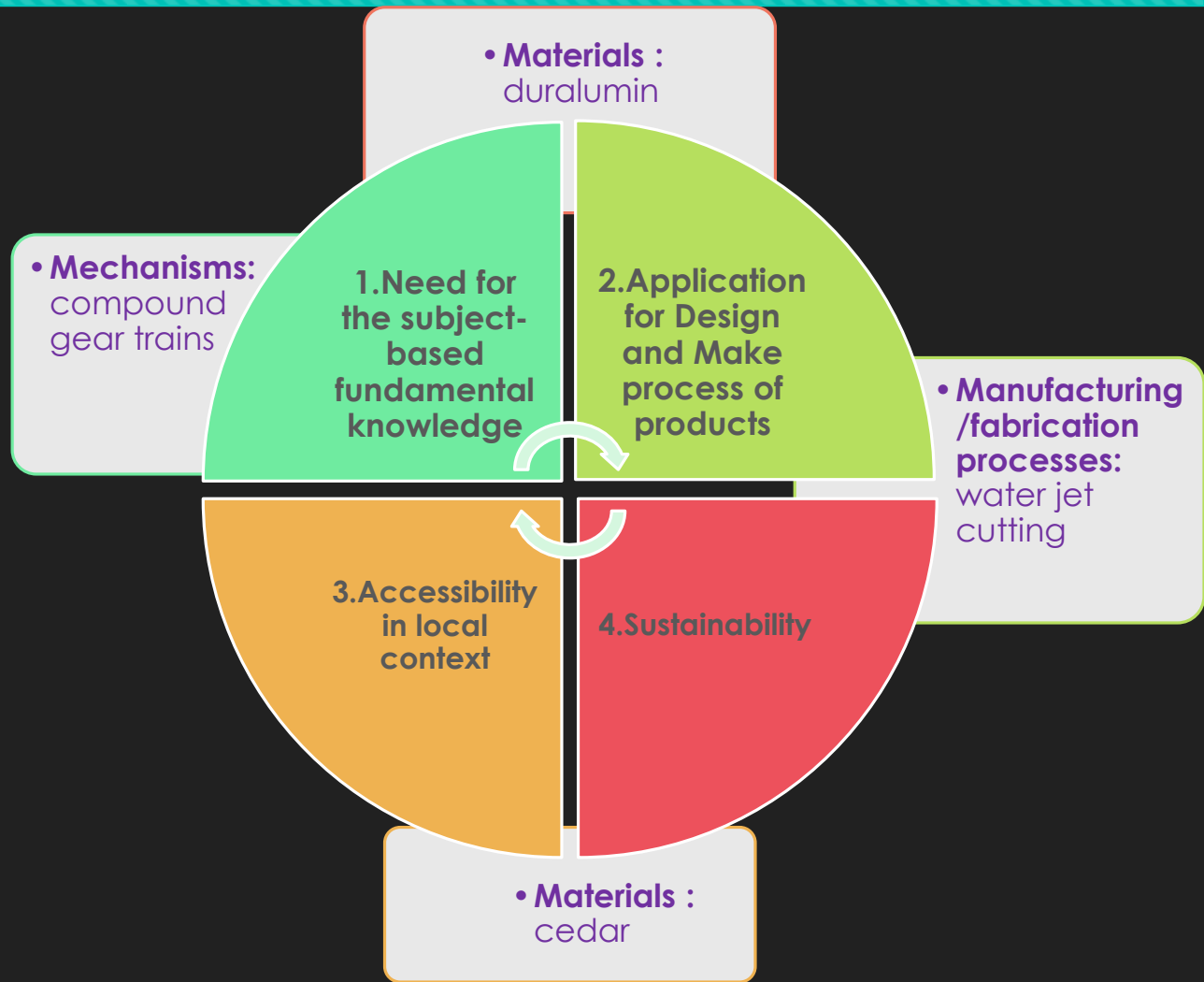
  only required to name and be aware of their application in the design and make processes

| 課題 | 項目 |
|---|---|
| **材料** | • **木材**<br>軟木：松木、杉木、[柏木]<br>硬木：飛機木、櫸木、樺木、橡木、山樟、柚木、白楊木、[櫻桃木、桃花心木、胡桃木]<br>人造板材：大芯夾板、刨花板、中密度纖維板 (MDF)、夾板<br>• **金屬**<br>含鐵金屬及合金：鑄鐵、碳鋼、軟鋼、不銹鋼、鍍鋅鋼、[高速鋼、工具鋼]<br>非含鐵金屬及合金：鋁、黃銅、青銅、紅銅、鉛、錫、鋅、[杜拉鋁、碳化鎢]<br>• **聚合物**<br>熱塑性塑料：丙烯腈-丁二烯-苯乙烯共聚物 (ABS)、亞加力／聚甲基丙烯酸甲酯 (PMMA)、尼龍／聚醯胺 (PA)、聚對苯二甲酸乙二酯 (PET)、聚丙烯 (PP)、聚苯乙烯 (PS)、發泡膠／泡沫聚苯乙烯 (EPS)、高密度發泡膠／擠塑聚苯乙烯 (XPS)、聚氯乙烯 (PVC)、[高密度聚乙烯 |

| Topics | Items |
|---|---|
| **Materials** | • **Woods**<br>Softwoods: pine, spruce, [cedar]<br>Hardwoods: balsa, beech, birch, oak, san cheong, teak, poplar, [cherry, mahogany, walnut]<br>Manufactured boards: blockboard, particle board, medium-density fibreboard (MDF), plywood<br>• **Metals**<br>Ferrous and its alloys: cast iron, carbon steel, mild steel, stainless steel, galvanised steel, [high speed steel, tool steel]<br>Non-ferrous and its alloys: aluminium, brass, bronze, copper, lead, tin, zinc, [duralumin, tungsten carbide]<br>• **Polymers**<br>Thermoplastics: acrylonitrile butadiene styrene (ABS), acrylic/polymethyl methacrylate (PMMA), nylon/polyamide (PA), polyethylene terephthalate (PET), polypropylene (PP), polystyrene |

# 例子 Examples (2)



# 為學校提供的支援措施
# Support measures for schools

# 學與教資源
# Learning and Teaching resource materials

| | 相關的學與教資源 Related L&T resource materials | |
|---|---|---|
| 1 | Visualisation of product design ideas using physical models (2021-將會推出)<br>利用實體模型實踐產品設計概念(2021-coming soon) | <br>中文版 |
| 2 | 設計與應用科技評估練習：學習範疇二 及單元三 (2021)<br>DAT Assessment Exercises : S2 & M3 (2021) | |
| 3 | 機械及機械元件 (2020)<br>Mechanisms and Mechanical Components (2020) | <br>English version |
| | 更多相關資源將會陸續推出<br>More related resources will be progressively rolled out | |

# 學與教資源
# Learning and Teaching resource materials

- 中文版 Chinese version: https://www.edb.gov.hk/tc/techsubj/resources
- 英文版 English version: https://www.edb.gov.hk/en/techsubj/resources



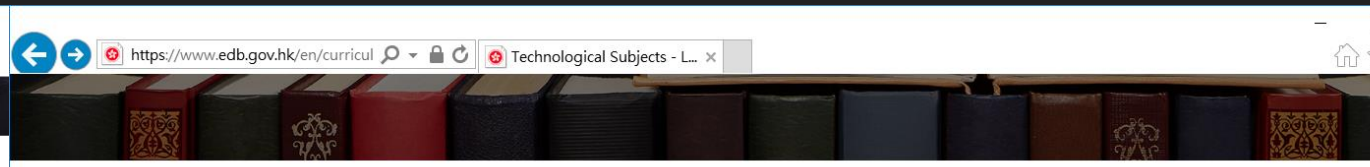

## 科技科目 – 學與教資源

《設計與應用科技課程及評估指引（中四至中六）－補充資料》(2020)(由2022/23學年起在中四級實施)

參考資源 新

- 教育局通函第188/2020號 PDF
- 機械及機械元件 - 學與教資源 ZIP
- 學習範疇二 科技原理評估練習 DOCX
- 單元三 設計實踐及材料處理評估練習 DOCX

* 更多相關資源將會陸續推出




## Technological Subjects – Learning and Teaching Resources

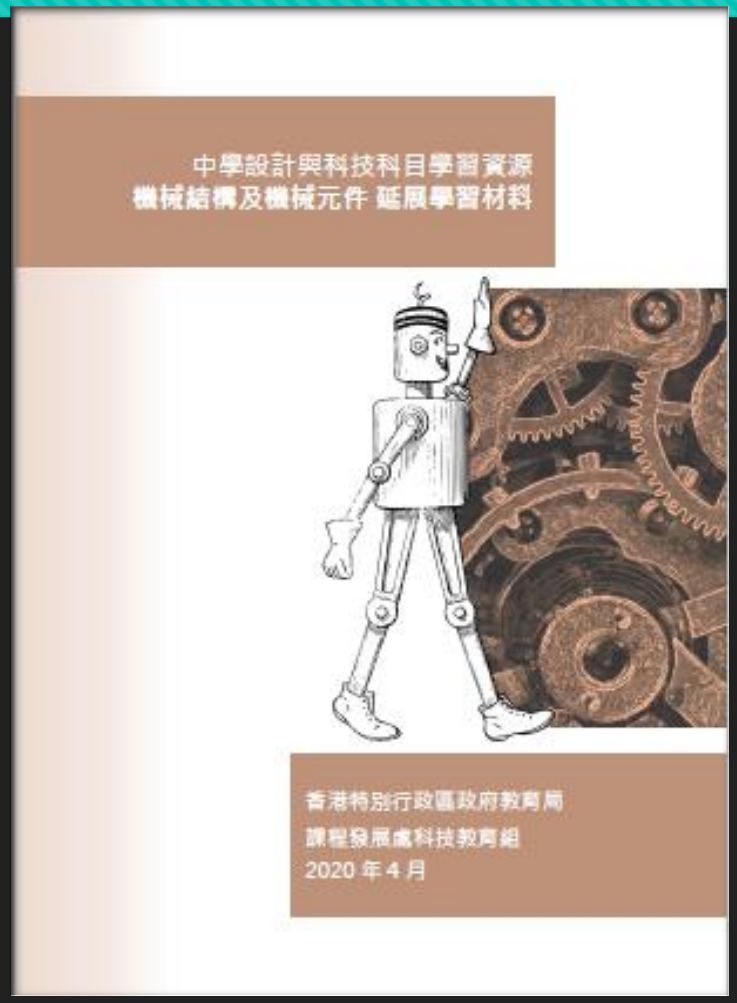
**"Design and Applied Technology Curriculum and Assessment Guide (Secondary 4 to 6) – Supplementary Notes" (2020) (to be implemented at S4 starting from the 2022/23 school year)**

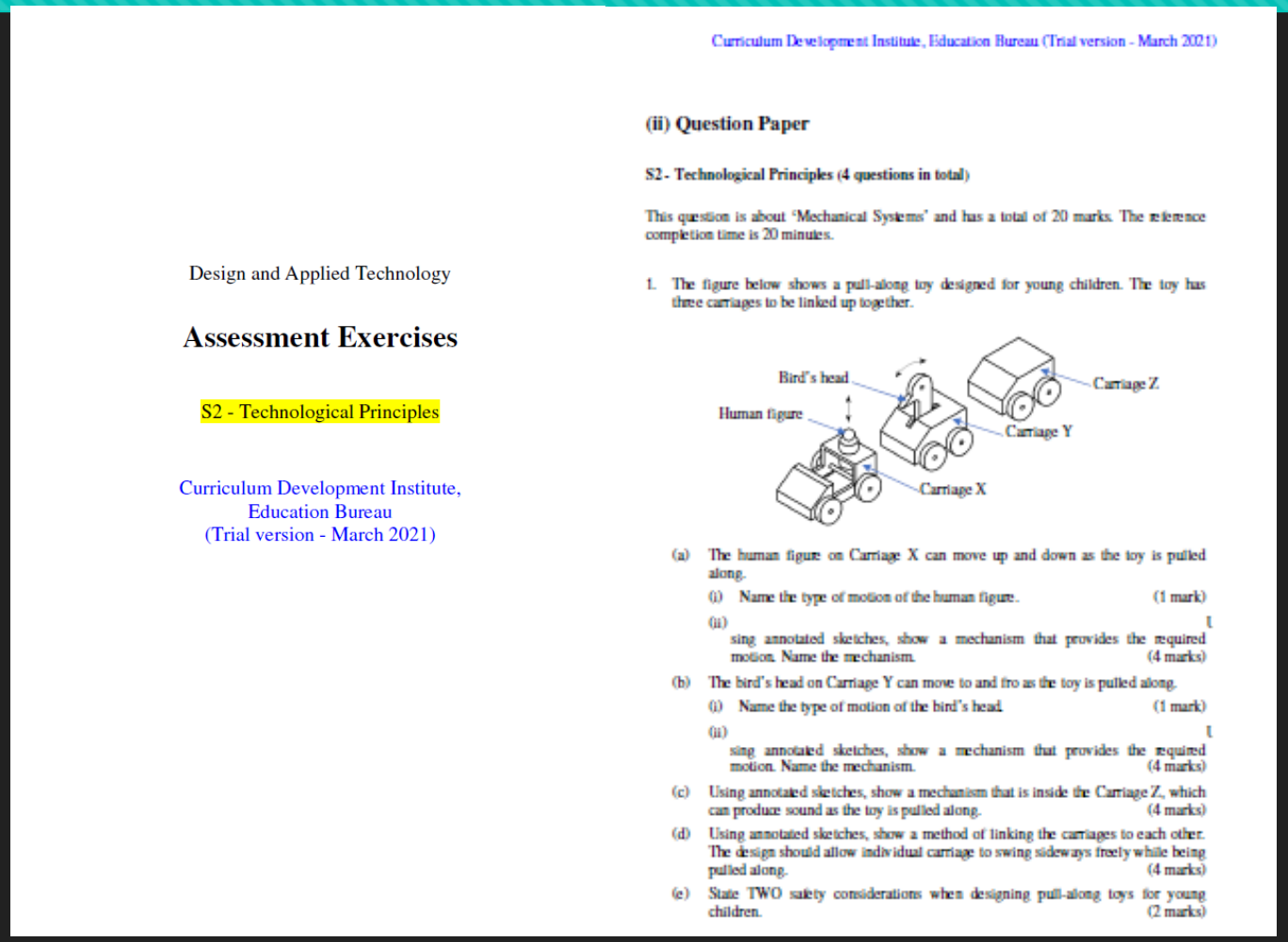
Reference Materials NEW

- Education Bureau Circular Memorandum No.188/2020 PDF
- Mechanisms and Mechanical Components - L&T Materials ZIP
- Strand 2 - Technological Principles Assessment Exercises DOCX
- Module 3 - Design Implementation and Material Processing Assessment Exercises DOCX

* More related resources will be progressively rolled out

# 學與教資源
# Learning and Teaching resource materials



Design and Applied Technology

**Assessment Exercises**

S2 - Technological Principles

Curriculum Development Institute,
Education Bureau
(Trial version - March 2021)



**(ii) Question Paper**

**S2 - Technological Principles (4 questions in total)**

This question is about 'Mechanical Systems' and has a total of 20 marks. The reference completion time is 20 minutes.

1. The figure below shows a pull-along toy designed for young children. The toy has three carriages to be linked up together.




(a) The human figure on Carriage X can move up and down as the toy is pulled along.
(i) Name the type of motion of the human figure. (1 mark)
(ii) sing annotated sketches, show a mechanism that provides the required motion. Name the mechanism. (4 marks)

(b) The bird's head on Carriage Y can move to and fro as the toy is pulled along.
(i) Name the type of motion of the bird's head. (1 mark)
(ii) sing annotated sketches, show a mechanism that provides the required motion. Name the mechanism. (4 marks)

(c) Using annotated sketches, show a mechanism that is inside the Carriage Z, which can produce sound as the toy is pulled along. (4 marks)

(d) Using annotated sketches, show a method of linking the carriages to each other. The design should allow individual carriage to swing sideways freely while being pulled along. (4 marks)

(e) State TWO safety considerations when designing pull-along toys for young children. (2 marks)

# 專業發展課程
# Professional Development Programmes

| | 相關專業發展課程 Related Professional Development Programmes (PDP) |
|---|---|
| 1 | 有效運用機械結構和機械元件學與教資源於設計與科技科目工作坊 (2021)<br>Workshop on Effective Use of the Learning and Teaching Resource Materials on Mechanisms and Mechanical Components for Design and Technology Subjects (2021) |
| 2 | 使用水刀切割機製作原型工作坊 (2020 & 2021)<br>Workshop on Using Waterjet Cutting Machine for Prototyping (2020 & 2021) |
| 3 | 通過設計與應用科技科校本評核的原型製作發展產品設計概念 (2019 & 2021)<br>Development of product design concept through prototyping in DAT School-based Assessment (2019 & 2021) |
| 4 | 應用鐳射切割機及平面電腦輔助設計軟件製作輪式機械人工作坊 (2019 & 2020)<br>Workshop on Making wheeled robots using laser cutter and 2D CAD software (2019 & 2020) |
| | 更多相關專業發展課程將會陸續推出<br>More related PDPs will be progressively rolled out |