



香港中學文憑考試

Hong Kong Diploma of Secondary Education Examination

2023

設計與應用科技

Design and Applied Technology

校本評核教師手冊

School-based Assessment Teachers' Handbook

2021 年 12 月更新

With updates in December 2021

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Preface

This Handbook serves as a guide to subject teachers for administering school-based assessment (SBA) for Design and Applied Technology (DAT) at their schools for the Hong Kong Diploma of Secondary Education (HKDSE) Examination. Teachers are expected to comply with the requirements and procedures stipulated in this Handbook when conducting the related assessment activities.

Notes on Changes to the Handbook

Due to the impact of the Novel Coronavirus (COVID-19) infection, the SBA requirements for students entering for the 2023 HKDSE have been streamlined to facilitate schools to complete the SBA in time. This streamlining is one-off and applicable to the cohort taking the 2023 HKDSE only. The following paragraphs have been revised and the changes are highlighted in this Handbook for teachers' easy reference.

Paragraph 1.1	Assessment Framework
Paragraph 2.1	SBA Requirements
Paragraph 2.4	Assessment Criteria
Appendix G	SBA Project Part 1 – Assessment Score Sheet
Appendix H	SBA Project Part 2 – Assessment Score Sheet
Appendix I	SBA Project – Suggested Titles

Chapter 1 Introduction

1.1 Assessment Framework

The public assessment of this subject is based on the Design and Applied Technology (DAT) Curriculum and Assessment Guide (Secondary 4 – 6) jointly prepared by the Curriculum Development Council and the Hong Kong Examinations and Assessment Authority (HKEAA). It will consist of a public examination component and an SBA component as outlined in the following table:

Component	Part	Weighting	Duration
Public Examination	Paper 1 Compulsory Part	30% 40%	2 hours
	Paper 2 Elective Part – each candidate is required to choose any two of the following five modules when they register for the examination; and attempt only one in the examination: 2A: Automation 2B: Creative Digital Media 2C: Design Implementation and Material Processing 2D: Electronics 2E: Visualisation and CAD Modelling	30% 40%	2 hours 1 hour 15 minutes
School-based Assessment (SBA)	Design Project	40% 20%	

1.2 Aims and Objectives

SBA is compulsory for all school candidates. In the context of public assessment, SBA refers to assessment administered in schools and marked by the students' own teachers. The primary rationale for SBA in DAT is to enhance the validity of the overall assessment and extend it to include the assessment of students' skills in the following aspects:

- Identifying and analysing design problems
- Collecting data
- Conducting research and investigation
- Generating and developing design ideas
- Proposing final solution(s)
- Presenting solution(s) with suitable media
- Evaluating final solution(s)

In SBA, students are expected to demonstrate their learning through providing evidence that they have worked on the following:

- **Design Process**
 - identification of a design need
 - statement of design project
 - acquisition of the necessary skills
 - modeling and fabrication of prototype
 - assessment of the feasibility, implementation, and value of the design
- **Technological Understanding**
 - understanding the operating principles and industrial practices of related technologies
 - innovative uses of technology
 - presentation of work and solicitation of feedback
- **Technological, Social and Entrepreneurship Awareness**
 - appreciation and critique of a design from a variety of perspectives
 - assessment of the social value and impact of a product and/or a system
 - decision making in design, manufacturing and marketing a product

Chapter 2 Assessment Requirements

2.1 SBA Requirements

2.1.1 School-based Assessment Project

The streamlined SBA requirements for Design and Applied Technology are summarised in the table below:

Secondary 5	Part 1	Weighting
	The SBA project Part 1 should include the following: - Identifying and investigating design opportunities - Developing a design brief and specifications - Generating design ideas	10%

Secondary 6	Part 2	Weighting
	The SBA project Part 2 should include the following: - Developing design ideas into a final solution	30%
	- Making the final prototype	10%
	- Testing and evaluating	

2.1.2 Requirements for Repeaters and Transfer Students

School repeaters are candidates who have sat the HKDSE Examination in previous year(s) and are currently enrolled as S6 students in a school to retake the examination as school candidates.

Generally speaking, SBA is compulsory for school repeaters. If a repeater studies in a school that offers Design and Applied Technology, the student has to be re-assessed in S6 and meet the stipulated SBA requirements. Their SBA results obtained in previous examinations will not be counted. If a repeater studies in a school that does not offer Design and Applied Technology, special permission may be granted for the student to be exempted from the SBA for this subject and his/her subject result will be based on the public examination result only. The school has to submit an application for exemption to the HKEAA when the repeater applies to enter for the examination and certify that the subject concerned is not offered by the school.

Transfer students are S6 students sitting the examination for the first time, but who have transferred from one school to another after S5. Transfer students will need to submit SBA marks for S6 only, which will be proportionally adjusted to 40% 20% and incorporated into their subject mark. Their SBA results obtained in S5 in the former school will not be counted.

For both school repeaters and transfer students, students' work completed in S5 can be carried forward to the new school for assessment. For example, students can make use of the data collected in S5 to

complete their work in S6.

Transfer students should provide information to their new school about the school in which they attended the S5 DAT course and the assessments completed there for their teachers' reference.

School repeaters and transfer students have to meet the same requirements for SBA in S6 as specified in paragraph 2.1.1 above.

Students who repeat S5 or who have transferred to an S5 class in another school are not considered to be school repeaters or transfer students. They must meet the full SBA requirements as normal S5 students.

2.1.3 Private Candidates

The HKEAA will not accept entries from private candidates for Design and Applied Technology.

2.2 Guidance in Assessment Process

Guidance on the conduct of the assessment:

- Ideally students should work in class to ensure authentication.
- Group work is allowed when conducting research, investigation and data collection.
- Students are required to analyse the findings and make their own individual reports.

2.3 Setting Assessment Tasks

SBA is an integral part of the DAT curriculum. It provides students with experience of genuine technological problems and activity as they work through the design cycle. SBA activities will include open-ended tasks which allow students to apply their technological capability by drawing on their accumulated experience.

Teachers may refer to Appendix I "SBA Project – Suggested Titles" for reference.

2.4 Assessment Criteria

Students should be assessed in accordance with the criteria shown below. The SBA marks awarded by schools should reflect the rank order of their students as well as the relative differences between students' achievements.

Zero marks will be given if the work submitted by a student fails to meet the minimum requirement of the assessment standard.

DAT School-based Assessment Project
Assessment Criteria

Area	Assessment Criteria	Marks	Weighting
Identify, investigate and outline design opportunities to address needs and wants	1. Identifying and investigating design opportunities	10	4%
	2. Developing a design brief and specifications	5	2%
Design and make prototypes that are fit for purpose	3. Generating design ideas	10	4%
	4. Developing design ideas into a final solution (a) Quality of design development (b) Quality of final design solution	15 10	10%
	5. Making the final prototype (a) Planning for making (b) Materials, tools, equipment and processes for making (c) Quality of final prototype	3 12 15	12%
Analyse and evaluate: • design decisions and outcomes • wider issues in design and technology	6. Testing and evaluating (a) Design decisions and prototype(s) (b) Wider issues in design and technology related to the final design solution	15 5	8%
	Total marks (%of subject mark)	100 (40%) 50 (20%)	

DAT School-based Assessment Project
Guidelines for Assessment

Assessment Criterion	Description	Mark Range	Maximum Mark
1. Identifying and investigating design opportunities	<ul style="list-style-type: none"> • Identifies a wide range of design opportunities within the selected context that can be related to the needs and wants of potential users and which inform the development of appropriate design briefs. • Employs a broad range of strategies, including both primary and secondary methods of investigation and practical experimentation to thoroughly explore design opportunities. • Undertakes effective and perceptive analysis of information, fully addressing the needs, wants and values of potential users. 	8-10	10
	<ul style="list-style-type: none"> • Identifies appropriate design opportunities which partially inform the development of appropriate design briefs. • Employs a range of strategies and techniques, which may include some practical activities, to explore design opportunities. • Undertakes general analysis of information, addressing the needs, wants and values of potential users to some extent. 	4-7	
	<ul style="list-style-type: none"> • Identifies a few design opportunities which have limited influence on the development of possible design briefs. • Undertakes little or limited investigation that may not directly relate to the context. • Demonstrates only a basic understanding of the information gathered, and/or undertakes superficial analysis of the information. 	1-3	
	Sub-total: (% of subject mark)	10 (4%)	

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DESIGN AND APPLIED TECHNOLOGY
SBA Project Part 2 – Assessment Score Sheet

School Code: _____

Internal Assessor: _____

School Name: _____

Name of Student	Project title number	4(a)	4(b)	5(a)	5(b)	5(c)	6(a)	6(b)	Total
		4. Developing design ideas into a final solution (a) Quality of design development	(b) Quality of final design solution	5. Making the final prototype (a) Planning for making	(b) Materials, tools, equipment and processes for making	(c) Quality of final prototype	6. Testing and evaluating (a) Design decisions and prototype(s)	(b) Wider issues in design and technology related to the final design solution	
		(15)	(10)	(3)	(12)	(15)	(15)	(5)	(75) (25)
1/12									
2/12									
3/12									
4/12									
5/12									
6/12									
7/12									
8/12									
9/12									
10/12									
11/12									
12/12									
Remarks (if any):									

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SBA Project – Suggested Titles

Candidates are required to choose ONE contextual challenge from the following and complete the SBA project:

Contextual Challenges

- | | | |
|---|---------------------------------------|---|
| 1 | A wind-powered two-legged walking toy | <p>Assembling mechanical toys is an effective way to help junior secondary students learn the working of different mechanisms.</p> <p>Design a wind-powered two-legged walking toy. The toy must:</p> <ul style="list-style-type: none"> (a) use wind as its sole power source; (b) be driven by mechanical means and not be equipped with any energy storage devices; and (c) have at least three walking patterns, configurable from changes in the mechanism. |
| 2 | An automatic cleaning robot prototype | <p>When designing and developing an automatic cleaning robot, it is necessary to use a prototype to test its cleaning function.</p> <p>Design an automatic cleaning robot prototype. The robot must be able to:</p> <ul style="list-style-type: none"> (a) clean a specific flat surface area of not less than 2m by 2m, without the need for continuous human control; (b) collect dust, dirt and/or litter from the area into a container within a reasonable amount of time; and (c) notify the user when the cleaning of the surface area is complete. |
| 3 | A stroboscopic zoetrope learning kit | <p>Using object stop-motion animation to help primary school students understand the life cycle of insects is an interesting way of learning.</p> <p>Design a stroboscopic zoetrope learning kit. The requirements are as follows:</p> <ul style="list-style-type: none"> (a) The kit must use the principle of stop motion animation, with the animation visible to the viewer directly under the strobe light. (b) The animation should present smoothly the life cycle of a kind of insect, with at least 24 differently-shaped 3D physical objects. (c) The kit should be easy to assemble, disassemble and to be packed into a box for storage and easy carrying. |

Notes for submission:

- Candidates should submit the following two items:
 - a working physical model/prototype, or a virtual 3D model plus a working partial physical model;
 - an A4 or A3 size portfolio.
- ‘Prototype’ refers to all working solutions including products, models and systems that are sufficiently developed to be tested and evaluated. A final prototype could be a highly finished product, made as ‘proof of concept’ prior to manufacture, a scaled working model or a functioning system where a full-sized product would be impractical.
- The physical model/prototype produced by the candidates as the final solution for the project should be able to perform proper testing and evaluation in the environment it is intended for. The main body of the final physical model/prototype should be made from raw materials and not be directly built using commercially available kits. However, commercially available mechanical components, control components and programming devices are permitted. Solely using computer modelling and simulation in lieu of physical model/prototype are not considered as appropriate alternatives in this regard.

Remarks:

The HKDSE Examination Regulations stipulate that a candidate may be liable to disqualification from part or the whole of the Examination or suffer a mark or grade penalty for breaching the regulations. For details, please refer to the SBA Teachers’ Handbook for Design and Applied Technology:

http://www.hkeaa.edu.hk/en/sba/sub_info_sba/dse_subject.html?10