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Hong Kong Diploma of Secondary Education Examination

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設計與應用科技

Design and Applied Technology

校本評核教師手冊

School-based Assessment Teachers' Handbook

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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

Comparing with the Teachers' Handbook for the 2023 HKDSE Examination, the following paragraphs have been revised and changes are highlighted in this Handbook for teachers' easy reference:

Paragraph 1.1	Assessment Framework
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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%	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%	~~2 hours~~ 1 hour 15 minutes
School-based Assessment (SBA)	Design Project	40%	

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

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 - Making the final prototype - Testing and evaluating	30%

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% 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.

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%)	

DAT School-based Assessment Project

Guidelines for Assessment

Assessment Criterion	Description	Mark Range	Maximum Mark
1. Identifying and investigating design opportunities	• 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
	• 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	
	• 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%)	

Assessment Criterion	Description	Mark Range	Maximum Mark
2. Developing a design brief and specifications	• Generates a comprehensive, clearly stated and challenging design brief, with a thorough consideration of investigation undertaken, that fully addresses both the context and the needs, wants and values of potential user(s), and leads to a significant breakthrough in the design. • Produces a comprehensive, relevant and clearly explained list of specifications, that includes ample technology applications, and includes detailed, realistic, objective and measurable criteria which inform the designing and making of a prototype.	4-5	5
	• Generates a satisfactory design brief to meet challenges to some degree, with some investigation undertaken that address the context and most of the needs, wants and values of potential user(s). • Produces a relevant and explained list of specifications that includes some technology applications, and includes realistic, objective and measurable criteria which inform the designing and making of a prototype.	2-3	
	• Generates a basic design brief, but which may be lacking in both clarity and challenge, with little or no reference to the investigation, and which does not address the context and only meets some of the needs and wants of potential user(s). • Produces a list of design specifications with minimal detail which has limited potential to inform the designing and making of a prototype.	1	
	Sub-total: (% of subject mark)	5 (2%)	

Assessment Criterion	Description	Mark Range	Maximum Mark
3. Generating design ideas	• Adopts appropriate and coherent idea generating strategies[1] to explore and generate a board range of different, appropriate and imaginative preliminary ideas in response to the contextual challenge. • Provides comprehensive and clear preliminary designs with constant reference to the design brief and specifications, research and investigation, and with thorough consideration of the physical and emotional needs of intended users. • Demonstrates clear and systematic evidence of originality[2] and innovation[3] throughout the idea generation process, and of being prepared to take design risks.	8-10	10
	• Adopts appropriate idea generating strategies to explore and generate a range of appropriate preliminary ideas in response to the contextual challenge. • Provides basic preliminary designs with some reference to the design brief and specifications, research and investigation, and with some considerations of physical and emotional needs of intended users. • Demonstrates some evidences of originality and innovation throughout the idea generation process.	4-7	
	• Adopts no or limited idea generating strategies to generate preliminary ideas in response to the contextual challenge. • Provides a vague preliminary design with limited reference to the design brief and specifications, and research and investigation. • Demonstrates little or no evidence of originality and innovation throughout the idea generation process.	1-3	
	Sub-total: (% of subject mark)	10 (4%)	

[1] Idea generating strategies include but are not limited to mind-mapping, mood board, SCAMPER, freehand sketching, and modelling.

[2] Originality refers to the novelty, uniqueness, and unusualness of design ideas or responses.

[3] Innovation refers to consideration of new methods or ideas to improve and refine design solutions to meet the needs of the intended clients or users.

Assessment Criterion	Description	Mark Range	Maximum Mark
4. Developing design ideas into a final solution (a) Quality of design development	• Demonstrates perceptive use of research and investigation to inform ongoing design development. • Demonstrates comprehensive and thorough use of an iterative approach[4] in the development of a design solution. • Provides refinement and alternatives to designs with sound justifications that are informed by the in-depth application of technical knowledge of materials and processes. • Demonstrates effective and accomplished use of graphical and modelling skills (including CAD techniques, freehand sketches, models and mock-ups) to consistently and appropriately develop or communicate design ideas, and to inform decisions in the development of a final prototype.	11-15	15
	• Demonstrates considered use of research and investigation to inform ongoing design development. • Demonstrates proper use of an iterative approach in the development of a design solution. • Provides refinement and alternatives to designs with some justifications that are informed by the sound application of technical knowledge of materials and processes. • Demonstrates appropriate and satisfactory use of graphical and modelling skills (including CAD techniques, freehand sketches, models or mock-ups) to appropriately develop or communicate design ideas, and to inform decisions in the development of a final prototype.	6-10	
	• Demonstrates superficial use of research and investigation to inform design development. • Demonstrates basic use of an iterative approach in the development of a design solution. • Provides refinement and alternatives to designs with little or no justifications that are informed by the basic application of technical knowledge of materials and processes. • Makes basic or little use of graphical and modelling skills (including CAD techniques, freehand sketches, models or mock-ups), and such models as are provided are rarely clear enough to enable appropriate development or communication of design ideas in the development of a final prototype.	1-5	

[4] Iterative design is a design methodology involving a cyclical process of prototyping, testing, analysing, and refining a product or process. Based on the results of testing, the most recent iteration of a design, changes and refinements are made.

Assessment Criterion	Description	Mark Range	Maximum Mark
(b) Quality of final design solution	• Develops a final design solution, with comprehensive and relevant details regarding materials, dimensions, finishes and fabrication techniques which clearly address all requirements of the design specifications.	8-10	10
	• Develops a final design solution, with sufficient details of materials, dimensions, finishes and/or fabrication techniques which address the main requirements of the design specifications.	4-7	
	• Develops a final design solution, with superficial details of materials, dimensions, finishes and/or fabrication techniques which address a few requirements of the design specifications.	1-3	
	Sub-total: (% of subject mark)	25 (10%)	

Assessment Criterion	Description	Mark Range	Maximum Mark
5. Making the final prototype (a) Planning for making	• Formulates and clearly communicates a timeline that is achievable, comprehensive and with relevant details of a logical sequence for the stages of making and testing the final prototype.	3	3
	• Formulates and presents a simple plan showing timed main stages and details that allows for monitoring of work progress.	2	
	• Action and time planning is not evident, or presents a generic action plan and/or time schedule that is not specific to the project.	1	
(b) Materials, tools, equipment and processes for making	• Applies appropriate technology including materials, systems, components and processes with good justifications; shows an excellent, in-depth understanding of material properties. • Uses appropriate tools, machinery and equipment skillfully (including digital design and manufacture[5]), and works with a high level of skill. • Makes accomplished use of an iterative approach to making[6] of the final prototype.	9-12	12
	• Applies appropriate technology including materials, systems, components and processes with adequate justifications; shows a satisfactory understanding of material properties. • Uses appropriate tools, machinery and equipment (including digital design and manufacture), and works with an adequate level of skill. • Makes considered use of an iterative approach in the making of the final prototype.	5-8	
	• Uses technology including materials, systems, components and processes with little justifications, and not all of which may be appropriate; shows limited understanding of material properties. • Uses appropriate tools, machinery and equipment (including digital design and manufacture), but works with a basic level of skill. • Makes basic or little use of an iterative approach in the making of the final prototype.	1-4	

[5] Digital design and manufacture in general refers to CAD, CAM, computer 3D modelling and simulation.

[6] Applying an iterative approach to making the prototype involves a process of planning, experimenting, making, testing and reviewing, to inform decision making, make improvements and refine prototypes at each stage of its making.

Assessment Criterion	Description	Mark Range	Maximum Mark
(c) Quality of final prototype	• Final prototype highly reflects the required design features of the final solution. • Final prototype produced to a high level of precision and accuracy, showing high quality and full attention to detail. • Final prototype functions as intended and fully meets the requirements of design specifications. • Quality of the overall appearance and finishing of the final prototype is good.	11-15	15
	• Final prototype basically reflects the design features of the final solution. • Final prototype largely produced to an adequate level of precision and accuracy, showing satisfactory quality and some attention to detail. • Final prototype mostly functions as intended and meets most of the requirements of the design specifications. • Quality of the overall appearance and finishing of the final prototype is satisfactory.	6-10	
	• Final prototype barely shows some design features of the final solution. • Final prototype is incomplete and made to a low level of accuracy, showing low quality and with little attention to detail. • Final prototype meets a limited part of the requirements of the design specifications. • Quality of the overall appearance and finishing of the final prototype is not satisfactory.	1-5	
	Sub-total: (% of subject mark)	30 (12%)	

Assessment Criterion	Description	Mark Range	Maximum Mark
6. Testing and evaluating (a) Design decisions and prototype(s)	• Undertakes sufficient, objective, critical and systematic analysis, including detailed test plan and evaluation of design ideas and decision making against the pre-set, measurable criteria whilst applying iterative design processes. • Undertakes objective and critical testing and evaluation of the final prototype in a predetermined environment, with the intended user group and against the pre-set, measurable criteria. • Draws highly convincing conclusions, with clear evidence of how the results are used to inform the modifications to the prototype, and with thorough consideration of the views of potential users. • Based on the testing and evaluation results, identifies how the design decisions and the final prototype could be further developed or improved to better meet the needs, wants and values of the intended users.	11-15	15
	• Undertakes basic and objective analysis, including a valid test plan and evaluation of design ideas and decision making partially against the pre-set, measurable criteria whilst applying iterative design processes. • Undertakes an objective testing and evaluation of the final prototype partially against the pre-set measurable criteria. • Draws generally appropriate conclusions, with some justifications of how the results are used to inform modifications to the prototype, and with some consideration of the views of potential users. • Makes reference to some aspects of the testing and evaluation results; shows how the design decisions and the final prototype could be further developed or improved; and attempts to meet the needs, wants and values of the intended users.	6-10	
	• Produces insufficient and mainly biased testing and evaluation of design ideas and decisions. • Produces an incomplete testing and evaluation of the final prototype, with superficial consideration of the views of potential users. • States some general and superficial suggestions on how the final prototype could be further developed or improved.	1-5	

Assessment Criterion	Description	Mark Range	Maximum Mark
(b) Wider issues in design and technology related to the final design solution	• Undertakes perceptive and critical analysis of the potential social, ethical or environmental impacts of final design solution, including positive and negative aspects, drawing balanced and supported conclusions.	4-5	5
	• Undertakes sound analysis of the potential social, ethical or environmental impacts of final design solution.	2-3	
	• Undertakes superficial analysis of the potential social, ethical or environmental impacts of final design solution.	1	
	Sub-total: (% of subject mark)	20 (8%)	

Chapter 3 Guidance in the Conduct of SBA

3.1 Provision of Information to Students

Students should be informed clearly at the beginning of the course of the various requirements and regulations regarding the SBA component, including:

- task requirements and assessment criteria;
- schedule of assessment and critical deadlines;
- the school's regulations and administrative procedures for conducting SBA;
- the importance of academic honesty and proper conduct in SBA;
- guidance on how to quote and acknowledge sources properly in their SBA work; and
- record keeping requirements.

Students should be asked to sign a declaration form regarding proper conduct in SBA at the beginning of each school year in which SBA is undertaken. *(Please refer to Paragraph 3.3 for details.)*

After the completion of their marking, teachers are expected to provide feedback to students, including their marks or grades on individual assessment tasks. Other appropriate feedback may include students' strengths and weaknesses as revealed in the assessments, and advice on how improvements can be made. Before submitting the SBA marks online, students should be informed of the marks awarded and that these marks are also subject to moderation by the HKEAA. Hence their marks may change after the moderation process. Details of the moderation mechanism are provided in Paragraph 5.2.

3.2 Guidance from Teachers

Teachers are expected to provide appropriate guidance to assist students in preparing for the completion of their design projects. It is understandable that teachers' guidance is most valuable to students in the learning and teaching process. However, it must be emphasised that undue assistance should not be provided to students while undertaking assessments that will count towards their public assessment results. As a general rule of thumb, the guiding principle should be that the ability of an individual student is fairly assessed and that the work submitted for assessment is the student's original work. The teacher should take into consideration any additional assistance given to a student who experiences genuine difficulty in completing the tasks such that the marks awarded represent the student's own achievement. Work submitted for final assessment cannot be revised and submitted for retrospective assessment.

It is appropriate for students to ask questions and for teachers to offer general advice at the initial stage, e.g. about alternative strategies that may be tried. However, teachers should not give specific guidance or detailed advice in such a way as to put into question the student's authorship of his/her work.

The following shows some examples of acceptable help from teachers:

- guiding students to develop effective time management for completing their work and advising students on the importance of keeping a complete record of their work;
- teaching students how to acknowledge information in their work when quoting from other sources;
- providing advice to students on the choice of appropriate topics for the assessment; and
- asking questions or providing general advice to students after being presented with initial drafts of their work.

The following shows some examples of non-allowable help from teachers:

- providing a detailed outline or specific suggestions to help students to complete or improve their work; and
- rewriting the content of their work for students.

3.3 Authentication of Students' Work

To ensure fairness in assessment, teachers should devise ways to ensure authentication of students' work, such as:

- Teachers should make use of class time to give guidance to students on the development of design solutions.
- Teachers should encourage students to make drafts and design solutions in class under their supervision.
- For tasks involving out of class activities, there should be a requirement that sufficient work is completed under direct supervision to allow teachers to authenticate students' work.
- For design projects, teachers should closely monitor students' progress, and ensure critical parts are completed in class, building in check points at critical moments, submitting marks and assessing students at different stages.

As Artificial Intelligence (AI) tools are developing rapidly and are increasingly becoming embedded in many aspects of our lives, teachers can also discuss the use of AI tools in learning and completing assignments in the context of SBA. Using AI tools in the learning process can undoubtedly offer new and exciting opportunities if used in a proper manner. However, using an AI tool to gain an undue advantage is considered to be malpractice and can have serious consequences. Students should also note that while AI tools are powerful and are likely to become even more powerful in the future, they cannot replace the actual learning experience. Overreliance and misuse of AI tools will diminish students' authentic learning opportunities. It should also be noted that AI tools are not without their shortcomings. Just as with other reference sources, it is important to realise that the use of AI tools in SBA must be properly acknowledged.

In order to strengthen the message to students about academic honesty and proper conduct in SBA, schools should ask their students to complete and sign a declaration form *(see **Appendix E**)* at the beginning of each school year in which SBA is undertaken to declare that all SBA tasks/assignments completed are their own and to agree to adhere to a code of honour in completing the SBA for all

subjects. The declaration form is available on the HKEAA website (http://www.hkeaa.edu.hk/en/sba/).

Students should be asked to keep a proper and complete record of their work.

When submitting the SBA marks online, teachers are required to confirm that, to the best of their knowledge, the work presented for assessment is the student's own work. School principals are required to confirm that the SBA has been conducted in accordance with the requirements of the HKEAA. Once the assessment is completed and marks submitted to the HKEAA, no further changes should be made to the students' work and assessment records.

3.4 Within-school Standardisation

The moderation of SBA marks submitted by schools to the HKEAA is conducted on a school basis, i.e. taking each individual school as a moderation unit. If there is more than one subject teacher teaching the subject to the same cohort of students in the school, it is necessary for the teachers involved to agree on the criteria for awarding marks so that the same standard of assessment is applied to all students.

Below are some recommended practices for schools' consideration:

- to conduct meetings among teachers to align their marking in accordance with the criteria;
- to conduct trial marking of samples of students' work;
- to adjust marks of some teachers, if necessary, to ensure consistency of assessment standards for the whole school; and
- to use reference materials (such as those provided by the HKEAA) and archive materials (such as samples of students' work from previous years) to help standardise marking within the school.

3.5 Handling Queries against Assessment Decisions

In general, schools already have procedures to handle any queries from their students regarding internal assessment results and can continue with their existing practice for handling SBA results. Some schools may consider setting up a panel to handle those queries that cannot be resolved by the subject teacher (to whom students should first address any queries). The panel may consist of the principal or his/her designate and the panel head. The panel will adopt appropriate procedures to investigate the case, such as

- listening to the points raised by the student;
- listening to the views and justifications provided by the subject teacher;
- assigning the panel head or another teacher to serve as a third-party to re-assess the student's work; and
- asking the student to complete a task of a similar nature for verification.

Based on the investigation of the panel, the school will make a judgment as to whether the student's query is valid or not. The student will be informed of the result within a reasonable period of time in

accordance with the school's procedures.

Schools are expected to resolve students' queries before submitting SBA marks to the HKEAA. After the release of public assessment results, candidates may submit an application to the HKEAA for rechecking of results, including the SBA component. However, they cannot appeal for a re-assessment of their performance in SBA.

3.6 Record Keeping

Schools are required to keep a proper record of the following until the end of the examination cycle, which normally means the completion of the appeal process after the release of public assessment results:

- SBA assessment tasks and activities administered;
- students' SBA marks and relevant assessment records; and
- documentation of any special or irregularity cases and the actions taken.

The keeping of a proper record of assessment will enable another teacher to take over from a predecessor who leaves the school during the course. To ensure a smooth handover of SBA duties to the succeeding teacher, schools are expected to arrange for the leaving teacher to hand over the relevant mark records and documents to the panel head (or other responsible person in the school).

Generally speaking, it is the students' responsibility to keep a good record of their work. Schools can have their own policy regarding the timeframe for returning assessed work to students. Whenever assessed work is returned to students, they should be informed that they are responsible for keeping safe custody of their work until the end of the assessment process, as it may be required for inspection at the request of the school or the HKEAA. Schools will be informed in advance about the details of the sample inspection.

Schools are encouraged to keep samples of students' work at different levels of performance as archive material, which may be useful for future reference as well as maintaining assessment standards across years. For large and extensive pieces of work, schools may consider keeping them in electronic format, such as video clips or digital images etc.

3.7 Language Requirements

Students are expected to complete their assessment tasks/activities in the same language as the medium of instruction according to schools' medium of instruction policy.

Chapter 4 Administrative Arrangements

4.1 Participating in SBA

SBA is compulsory for all school candidates. Schools which cannot comply with the requirements specified in this Handbook will not be eligible to present candidates to enter for the subject in the examination. Schools may refer to the HKDSE Examination Regulations regarding the procedures for applying to participate in the examination.

Permission for schools to continue with the SBA in a particular subject will be automatically renewed unless the SBA Supervisor's recommendation is to the contrary. In cases where the HKEAA considers that a particular school does not meet the stipulated requirements for the implementation of SBA, the HKEAA may consider taking the following action(s) as appropriate to remedy the situation:

- providing further guidance to the school or teachers concerned;
- issuing a warning letter to the school concerned and granting a grace period for the school to meet the requirements; and
- barring the school from entering candidates for the subject in subsequent examinations until the school is able to demonstrate compliance with the stipulated requirements of the SBA component.

4.2 Late Submission and Absence from Assessment

Students should submit their completed work on schedule. Those submitting the work late may be subject to a penalty in accordance with their school's regulations.

Students failing to complete the assessment for legitimate reasons should give those reasons and provide relevant supporting documents (e.g. medical certificates) to the HKEAA via their schools for special consideration, which will be given for medical and other legitimate reasons.

Students failing to submit work for assessment without legitimate reasons will get a zero mark in the assessment(s) concerned. Schools may consider issuing a warning letter to the student concerned to remind him/her of the consequences of absence from assessment or failure to complete the work.

4.3 Students with Special Educational Needs

Students with special educational needs will not be deprived of their right to the HKDSE school-based assessment. When conducting SBA tasks, schools have the autonomy to provide special arrangements to these students depending on the nature and severity of their disabilities. The provision of such arrangements allows these students to be equitably assessed under suitable conditions without having an unfair advantage. Examples of such arrangements may include:

- extension of preparation time;
- extension of assessment time;
- provision of ancillary aids; and
- provision of special assistance during the conduct of the assessment etc.

In cases where a school cannot provide special arrangements for a particular student, the matter should be brought to the attention of the HKEAA in writing by the principal of the school for HKEAA's special consideration at the beginning of the school year. Such cases, once approved, may include exemption from part or whole of the SBA tasks.

4.4 Submission of SBA Marks

The HKEAA will coordinate the deadlines of mark submission for different subjects. At the beginning of the course, the HKEAA will inform schools of these deadlines so that subject teachers can plan their SBA schedule for the year. Teachers should also inform students of these deadlines and set specific dates for students to complete their SBA work in accordance with their schools' schedule.

It must be emphasised that the submission deadlines do not mean deadlines for students to complete their work, as ample time should be left for finalising the assessment results and records as well as following up on any irregularities so that marks can be submitted to the HKEAA on time. Schools are advised to coordinate the timing for students to complete SBA tasks across subjects, taking into account the workload of students and teachers, so that students' work for assessment is not concentrated into one or two critical months but spread out over two years.

All schools have to submit the SBA marks using the online School-based Assessment System. A user manual for the system and training sessions will be provided to help teachers to become familiar with the system before they need to submit SBA marks. Before the school principal endorses the marks for submission to the HKEAA, teachers have to check carefully the marks entered in the system to ensure the marks awarded to each student are correct.

In order to streamline the administrative procedures, schools are only required to **submit all S5 and S6 SBA marks to the HKEAA in one go in S6**. Regarding the adoption of this 'One-off Submission', the following points should be noted:

(a) There is no change to the SBA requirements and how SBA is conducted in school. SBA should

continue to be conducted in S5 and S6 according to the stipulated SBA requirements and schools' internal schedule.

(b) The S5 SBA marks should be properly kept by the school for submission in S6. To facilitate schools to store the S5 SBA marks, the HKEAA will provide SBA mark sheet templates (in the format of MS Excel files) for teachers to input the SBA marks for internal record-keeping.

(c) A list of frequently-asked questions concerning this measure can be found at www.hkdse.hkeaa.edu.hk > SBA-FAQs for one-off submission of S5 and S6 SBA Marks.

4.5 Declaration Requirements

To prevent potential/perceived conflicts of interest, teachers conducting SBA have to declare whether the students they are assessing are their relatives (relatives include children, brothers and sisters, nephews and nieces, cousins and others living in the same home). The declaration records will be submitted to the HKEAA through the School-based Assessment System.

Apart from the provision of the declaration records to the HKEAA, school leaders are also expected to establish an internal system for directing teachers to make formal declaration of conflict of interest at the beginning of the school year in regard to their personal relationship with the students they teach, and to take appropriate actions to mitigate the declared interest, e.g. redeployment of teachers to avoid their conducting the assessments for the student(s) concerned, where applicable.

4.6 Security Requirements

As SBA marks will count towards students' public assessment results, for fairness and security purposes, schools have to adopt appropriate measures, including those adopted in internal examinations, in the conduct of those assessments, where preservation of secrecy is deemed necessary before the assessment.

Chapter 5 Moderation of SBA Marks

5.1 Rationale for Moderation of SBA Marks

The main reason for having moderation is to ensure the fairness of SBA. Teachers know their students well and thus are best placed to judge their performance. In consultation with their colleagues, they can reliably judge the performance of all students within the school in a given subject. However, they are not necessarily aware of the standards of performance across all schools. Despite training in carrying out SBA, and even given that teachers will assess students on the same tasks and using the same assessment criteria, teachers in one school may be harsher or more lenient in their judgments than teachers in other schools. They may also vary in the awarded mark ranges.

To address these potential problems, the HKEAA (like most other examination authorities) makes use of various methods for "moderating" assessments submitted by different schools, with an aim to ensuring the comparability of SBA scores across schools.

5.2 Moderation Mechanism

In DAT, the moderation is conducted by HKEAA appointed personnel (e.g. moderators, coordinators) through inspection of samples of students' work covering the full range of attainment, followed by recommendations for mark adjustment. The HKEAA will specify the sample size required for inspection, which will be sufficient for evaluating a school's judgment at different performance levels. Additional samples may be requested if necessary. Students' SBA marks may be adjusted but the rank order determined by the school will remain unchanged. Details of the moderation mechanism are provided in the booklet "*Moderation of School-based Assessment Scores in the HKDSE*", which is available on the HKEAA website (http://www.hkeaa.edu.hk/en/sba/).

The moderation is conducted on a school basis, i.e. taking each individual school as a moderation unit. If there is more than one subject teacher teaching the subject to the same cohort of students in the school, it is necessary for the teachers involved to agree in advance on the criteria for awarding marks, so that the same standard of assessment is applied to all students. Teachers may refer to *Paragraph 3.4* for some recommended practices on within-school standardisation.

After the examination each year, SBA moderation reports will be sent to schools for their reference. The report will specify the extent of adjustment made to the marks submitted by schools.

Chapter 6 Malpractice

Malpractice refers to any activities that allow a student to gain an undue advantage over others, examples of which include, but are not limited to:

- presenting work completed by others, including those generated using Artificial Intelligence tools, in part or in whole, as one's own work; and
- including material copied directly, in part or in whole, from books, newspapers, magazines, CDs, the Internet or other sources without proper acknowledgement.

These behaviours are generally referred to as plagiarism.

6.1 How to Handle Malpractice

Students are forbidden to indulge in any malpractice when completing their assessment activities. Teachers are expected to provide sufficient supervision to ensure that the work which is assessed is that of the student concerned (see *Paragraph 3.3 Authentication of Students' Work* for details) Teachers know their students well and hence should be able to detect plagiarism and other malpractices through a close monitoring of students' work.

Schools should establish procedures for handling suspected malpractice cases. These procedures may include investigating suspected cases and determining appropriate action for proven incidents of malpractice. During the investigation, students may be required to:

- provide evidence of the development of their work;
- discuss the content of the work with teachers and answer questions to demonstrate their knowledge and understanding of the work submitted;
- complete, under supervision, a supplementary assessment task related to the original task; and
- attend an interview or complete a test to demonstrate the work submitted is their own.

Plagiarism

Plagiarism in SBA is to be handled as described below, depending on the severity of the offence:

Category	Method of handling
Serious plagiarism cases (P cases): Serious cases in which nearly the whole or the whole SBA task/assignment is plagiarised, with very little or no contribution from the student.	To be forwarded to the HKEAA for follow up
Other plagiarism cases: Less serious cases, including - minor infringement identified in students' SBA work, or - part of the student's SBA work copied from source(s) without proper acknowledgement, but the student has made some contribution to the work.	To be handled by schools

Procedures in Handling P cases

Schools should submit a report on the P cases identified to the HKEAA for follow-up, after the completion of mark submission in S6. The report should record details of the case and be submitted with relevant documents. ***Appendix F*** shows a template of the report for schools' use in reporting such cases, which is available on the HKEAA website (http://www.hkeaa.edu.hk/en/sba/). When submitting the SBA marks to the HKEAA, schools should input "P" in the relevant mark box for the student concerned.

These P cases will be deliberated by the HKEAA's Standing Committee and, for proven cases, a recommendation will be made to the Public Examinations Board (PEB) for their consideration. The PEB will review all the information and evidence and decide on the penalty to be imposed in accordance with the Board's guidelines on handling examination irregularities. The levels of penalty to be imposed for proven P cases are as follows:

(a) **Zero marks** will be given to the task in which serious plagiarism is proven. In addition, a penalty of **downgrade by one level** will be imposed in the subject concerned.

(b) For extreme cases, e.g. repeated offence of plagiarism, candidates may be subject to **disqualification from the subject(s) concerned or the whole examination**.

Procedures in Handling Other Plagiarism Cases

Other less serious cases are to be dealt with by the school. These cases need not be reported to the HKEAA for follow-up. However, schools should keep a proper record of such cases.

For proven cases, schools should impose appropriate penalty in accordance with the school regulations and the HKEAA guidelines, taking into consideration the seriousness of the offence. This may include:

- Issuing a warning letter to the students (e.g. for minor offence due to negligence or committed at the initial stage of the assessment);
- Deducting marks for the task concerned; and
- Awarding zero marks for the task concerned.

It is important to note that in marking students' work, any proven plagiarised material should be disregarded and any marks awarded should be based on the students' own work only.

After the release of examination results, candidates may only submit applications to the HKEAA for rechecking of their SBA marks but cannot apply for a re-assessment of their performance in SBA. Hence it is important that students should be informed of the penalty imposed. Schools should handle any queries from students against assessment decisions in accordance with their established internal procedures. Any queries from students should be resolved before submitting the SBA marks to the HKEAA.

Plagiarism Cases Identified by the HKEAA

After the completion of mark submission in S6, the HKEAA will conduct moderation of SBA marks and review of samples of student work collected from schools. Any suspected plagiarism cases identified during this process will be handled in a consistent manner as those identified by schools.

Schools will be required to follow up on any suspected cases identified. Both P cases and other less serious cases will be handled following similar procedures as stipulated above.

6.2 Prevention of Malpractice

At the beginning of the course, schools are expected to advise students on what malpractice is and what its consequences are. To avoid plagiarism, guidance needs to be provided to students on how to acknowledge sources properly in their work.

In completing the SBA, students can make reference to any sources (books, newspapers, magazines, the Internet etc) and/or discuss with their peers/parents but they must not plagiarise when completing their work. They should acknowledge sources properly in their work. Some examples on how to acknowledge sources properly are provided in the booklet "*HKDSE Information on School-based Assessment*", which is available on the HKEAA website (http://www.hkeaa.edu.hk/en/sba/).

Appendix A

Roles and Responsibilities of the HKEAA, EDB, Schools and Students

The following summarises the roles and responsibilities of different parties involved in the administration of the SBA, including the HKEAA, the Education Bureau (EDB), schools (principals and teachers) and students.

HKEAA will:

1. develop the assessment framework, assessment/administrative guidelines and marking criteria for SBA;
2. conduct research in SBA (e.g. with regard to international policies and practices, moderation methods, psychometric issues involved and implementation issues);
3. lead and organise teacher professional development courses on assessment in collaboration with the EDB;
4. monitor the conduct of SBA in schools to ensure compliance with SBA requirements;
5. appoint SBA Supervisors and District Coordinators to oversee and support the implementation of SBA in individual subjects;
6. process assessment records submitted by schools;
7. moderate SBA marks submitted by schools; and
8. provide feedback to schools.

EDB will:

1. develop the curriculum framework;
2. sponsor and organise teacher professional development courses on assessment in collaboration with the HKEAA;
3. provide learning and teaching resources to facilitate the implementation of SBA in schools;
4. support the WebSAMS system to facilitate retention of SBA teacher/class data and assessment records; and
5. evaluate quality assurance processes of school assessments including SBA (e.g. through inspection of teaching facilities, observation of lessons and the external school review process).

Principals (or their designates) will:

1. establish appropriate regulations and procedures for the proper administration of SBA within the school;
2. send representatives to attend SBA conferences and coordinator-teacher meetings;

3. nominate a School Coordinator for each subject to oversee the conduct of the SBA in that subject;
4. provide information on the administration of SBA as required by the HKEAA;
5. endorse the SBA marks for submission to the HKEAA;
6. facilitate visits by HKEAA subject managers and examination personnel (e.g. supervisors, district coordinators and moderators) who may need to review students' work and assessment records;
7. maintain a quality assurance system for SBA; and
8. provide feedback to the HKEAA.

Teachers will:

1. explain to students the aims, requirements and assessment criteria of SBA, as well as the relevant school regulations and procedures;
2. administer SBA as an integral part of learning and teaching;
3. administer SBA according to the regulations and procedures set by the HKEAA and the school;
4. provide information on the administration of SBA as required by the HKEAA;
5. assess students' work/performance using the assessment criteria set by the HKEAA;
6. authenticate students' SBA work and performance records;
7. inform students of the SBA marks awarded before submitting the marks to the HKEAA;
8. submit SBA marks to the HKEAA on schedule;
9. retain students' assessment records and students' work and make them available for inspection if required; and
10. provide feedback to the HKEAA.

Students should:

1. understand that:
   - SBA tasks are part of learning and teaching of the respective subject;
   - the process of SBA, including feedback from teachers, helps them develop skills and knowledge that may not be reflected in public examinations;
   - learning through SBA complements learning in other parts of the curriculum;
2. become familiar with the task requirements, the assessment criteria, critical dates, school regulations and procedures for SBA;
3. complete the assessment tasks honestly and responsibly in accordance with the stipulated requirements;
4. complete the assessment tasks on time; and
5. keep a proper record of their SBA-related work till the end of the examination cycle and present it for inspection at the request of the school or the HKEAA.

Appendix B

Roles and Responsibilities of Supervisors, District Coordinators and School Coordinators

When SBA is implemented in a certain subject, the HKEAA will appoint an SBA Supervisor and District Coordinators to oversee and support the implementation of SBA. School principals will be requested to nominate a teacher to be the School Coordinator for a particular subject, who will serve as a link between the subject teachers within the school and the HKEAA and the District Coordinators. Their roles and responsibilities are summarised below:

SBA Supervisor

The duties of the SBA Supervisor are to:

1. be responsible to the HKEAA for the proper monitoring of SBA;
2. make any necessary arrangements with District Coordinators to familiarise them and subject teachers with the SBA, and to align assessment standards;
3. bring any irregularities to the notice of the HKEAA together with recommendations for action(s) to be taken, including SBA mark adjustment;
4. keep the HKEAA informed of the progress of SBA and recommend amendments when deemed desirable;
5. oversee the appointed District Coordinators;
6. make recommendations to the HKEAA regarding SBA moderation;
7. advise on the cut score of each reporting level during the grading meeting (if applicable); and
8. write a report on the conduct of SBA and submit it to the HKEAA at the end of the school year.

SBA District Coordinators

SBA District Coordinators provide a link between the Supervisor and School Coordinators/teachers. The duties of a District Coordinator are to:

1. liaise with School Coordinators and oversee the implementation of SBA in an assigned group of schools;
2. conduct meetings with School Coordinators/teachers involved in his/her group as necessary, pass on information about SBA to teachers and discuss difficulties and receive comments/feedback from teachers;
3. report to the Supervisor any difficulties or irregularities in the implementation of SBA in the schools in his/her group and recommend any necessary action;
4. provide guidance and support to teachers in the implementation of SBA in schools and ensure adherence to the guidelines;
5. help teachers in the schools in his/her group to establish as far as possible a uniform standard in assessment;
6. assist the Supervisor in matters concerning the operation of SBA;

7. inspect samples of students' work and relevant assessment records provided by teachers in his/her group and provide feedback to teachers on the standards of marking and students' work in his/her group; and
8. complete a report concerning each of the schools in his/her group at the end of the school year.

SBA School Coordinators

The School Coordinator for Design and Applied Technology, who is nominated by the school principal, provides a link between the subject teachers within a school and the District Coordinator and the HKEAA. The duties of a School Coordinator include, but are not limited to, the following:

1. liaise with the HKEAA and the District Coordinator regarding SBA matters;
2. plan the assessment schedule (i.e. number, timing and sequence of assessment tasks) in consultation with all subject teachers teaching the same cohort of students;
3. coordinate the reporting of marks to the HKEAA; and
4. report to the District Coordinator any difficulties or irregularities in the implementation of SBA in his/her school.

Appendix C

Calendar of Events

The following table shows a tentative schedule of SBA events for the 2024 HKDSE Design and Applied Technology Examination:

School Year	Month	Event
S4	September – November 2021	SBA conference and group meetings: ● Introduction of supervisors and district coordinators ● Latest information about the SBA ● Training sessions for school coordinators and teachers ● Group meeting and discussion
	By July 2022	Schools to set up appropriate regulations and procedures for the conduct of SBA and to finalise the assessment arrangements in S5 and S6
S5	September 2022	2024 SBA handbook uploaded to the HKEAA website (http://www.hkeaa.edu.hk/en/sba/)
	September 2022	Schools to provide the following information to the HKEAA: ● Name(s) of and relevant information about S5 teachers
	September – November 2022	SBA conference and group meetings: ● Updates on SBA for 2024 HKDSE ● Arrangement for submission of assessment results/records and other details ● Experience sharing on the try-out of SBA
	September 2022– May 2023	S5 teachers to conduct SBA assessment activities according to schools' assessment plans

School Year	Month	Event
S6	September 2023	Schools to provide the following information to the HKEAA: ● Name(s) of and relevant information about S6 teachers
	September – November 2023	SBA conference and group meetings: ● Feedback to schools on S5 assessment results ● Updates on SBA
	September – December 2023	S6 teachers to conduct SBA assessment activities according to schools' assessment plans
	January 2024	Schools to submit S5 and S6 SBA marks (SBA Projects Parts 1 and 2) to the HKEAA
	February – March 2024	Sample inspection of assessment results and records
	March – May 2024	SBA marks to be analysed and moderated by the HKEAA. Schools to submit samples of student work for expert moderation
	July 2024	Release of 2024 HKDSE Examination Results
	October 2024	Schools to receive feedback on the outcome of moderation

Appendix D

Channels of Communication

(1) Teachers may contact the HKEAA via one of the following means:

	Examination Arrangements and Application for Special Consideration	**Subject-specific Information and Operation of SBA in Schools**
Tel No.:	3628 8860	3628 8070
Fax No.:	3628 8928	3628 8091
Address:	Manager - DSE (SBA) School Examinations and Assessment Division Hong Kong Examinations and Assessment Authority 12/F, Southorn Centre 130 Hennessy Road, Wan Chai Hong Kong	SBA Team, Assessment Development Division Hong Kong Examinations and Assessment Authority 13/F, Southorn Centre 130 Hennessy Road, Wan Chai Hong Kong

(2) Teachers may view the latest SBA information or download useful documents from the HKEAA website:
- URL: http://www.hkeaa.edu.hk
- For general information, please click "HKDSE" on the homepage and then choose "SBA".

(3) School Coordinators/teachers may contact the District Coordinator assigned for their schools for guidance and advice on matters concerning SBA.

Appendix E

Hong Kong Diploma of Secondary Education Examination
Student Declaration Form for School-based Assessment (SBA)
Completed in the School Year 20__-__

Notes:

1. *This form should be signed by senior secondary students at the beginning of each school year in which SBA is undertaken. Only one form needs to be completed by each student.*
2. *The completed form should be retained by the school until the end of the public examination cycle.*

School Name: _____

Student's Name: _____

Class: _____ Class No: _____

Important Reminder to Students:

1. It is of utmost importance that academic honesty is maintained in SBA. Students are forbidden to indulge in any malpractice when completing their assessments.
2. Student can make reference to sources but must not plagiarise when completing their work. They should write in their own words and should not simply copy others' words or ideas, including those generated using Artificial Intelligence tools, and present them as their own. If necessary, they can quote or make reference to something written by another author in their work, as long as they ensure that these quotes or references are identified and the sources properly acknowledged.
3. Students are advised not to quote excessively in their work, as this would mean that they themselves could only make a minimal contribution to that piece of work and consequently they would be likely to get low marks from their teacher.
4. Students can make reference to the booklet *"HKDSE Information on School-based Assessment"*, (http://www.hkeaa.edu.hk/en/sba/). Some examples on how to quote and acknowledge sources properly are provided in the booklet.
5. Students will be subject to severe penalties for proven plagiarism. The HKDSE Examination Regulations stipulate that a candidate may be liable to disqualification from the subject concerned or the whole of the Examination, or suffer a mark or grade penalty for breaching the Regulations.

I certify that I have read the above Reminder and declare that:

- **All SBA tasks/assignments work to be completed for all subjects in this school year will be my own work.**
- **My SBA work will not include any materials which have been copied from sources without acknowledgement.**
- **I am responsible for ensuring that the work produced is my own and will bear the consequences for committing plagiarism or other malpractice in SBA.**

Student's signature: _____ Date: _____

Appendix F

Hong Kong Diploma of Secondary Education Examination
Plagiarism Report in School-based Assessment (SBA)

Notes:

1. *Details of serious plagiarism cases (P cases) are to be recorded in this report, which should be submitted to the HKEAA for follow-up after the completion of the mark submission in S6, together with relevant documents.*
2. *When submitting the SBA marks to the HKEAA, schools should put "P" in the relevant mark box for the student concerned.*

School Name: _____

Student's Name: _____ Candidate No.: _____

Class: _____ Class No.: _____

Subject: _____

Case Summary

	Details / Remarks
Task/assignment involved	
Date of completion of the task/assignment	
Irregularities identified	*(Please tick as appropriate)* ☐ Nearly the whole task/assignment is plagiarized ☐ The whole task/assignment is plagiarized ☐ Others (please specify): _____ _____
Documentation	The following documents are submitted as evidence: 1. The SBA task/assignment 2. The student's work, with the plagiarised part(s) highlighted 3. The source material(s) from which the unacknowledged work is copied 4. Others (*please specify*): _____ _____
Follow-up actions taken	Student was interviewed on _____(Date) and informed about the submission of this report to the HKEAA. Others (*please specify*):_____ _____

Contact Person

Name: _____ Post: _____

Telephone No.: _____

Signature of Subject Teacher	Signature of Principal	School seal
Name of Subject Teacher	Name of Principal	
Date		

2024 Hong Kong Diploma of Secondary Education Examination

DESIGN AND APPLIED TECHNOLOGY

SBA Project Part 1 – Assessment Score Sheet

School Code: _____ Internal Assessor: _____

School Name: _____

Name of Student	Project title number*	1	2	3	Sub-Total
		1. Identifying and investigating design opportunities	**2. Developing a design brief and specifications**	**3. Generating design ideas**	
		(10)	(5)	(10)	(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					

* If a student does not choose one of the project titles suggested by the Authority, please specify clearly the student's own project title.

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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)
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):

Hong Kong Diploma of Secondary Education Examination 2024

DESIGN AND APPLIED TECHNOLOGY

SBA Project – Suggested Titles

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

1. A scalable wave power generation system

Context:

The government is exploring the use of a scalable wave power generation system in facilities along the seaside/riverside, like promenades and piers, so that wave energy can be used to power streetlights. The system is one which consists of one or more electrical and/or mechanical units, such that more units can be added to generate more power.

The government is now inviting interested parties to construct and install a trial run prototype in a seaside/riverside to demonstrate the technical feasibility of this system.

Requirements:

To complete this challenge, you need to make physical, scaled models for (A) demonstrating the technical feasibility and (B) showing the construction of the trial run prototype in the actual environment. You can create two separate physical, scaled models or combined into one.

(A) Demonstrating the technical feasibility

Design a physical, scaled model of the scalable wave power generation system which demonstrates technical feasibility in producing electrical power. The model should:

- consist of at least one unit of the scalable wave power generation system, and should be able to demonstrate how additional units can be added to generate more power.
- be able to (1) measure electrical power generated with simulated water waves, which can be used to (2) estimate the amount of power generated through one unit of the scalable wave power generation system, and to (3) estimate how many units are required to power one typical streetlight by the trial run prototype.

(B) Showing the construction of the trial run prototype in the actual environment

You should choose a seaside/riverside in Hong Kong where the trial run prototype will be installed. Design a physical, scaled model which shows how a trial run prototype of the system can be constructed at the chosen location to power one streetlight. This can be a separate model or combined with the model above. Moreover, recommendations on appropriate use of materials for the trial run prototype should be provided.

2. Interactive playground for hamster

Context:

Hamsters are common household pets and friendly to humans. As they need plenty of exercise to stay healthy and happy, an interactive playground for hamster allows them to get exercise they need and to interact with their owners while the owners are away from home.

Requirements:

Design a playground to promote the physical activities for hamsters. The playground should:

- consist of at least four interconnected units. (1) The connections between these four units can be re-arranged by the owner to keep the hamster with fresh experience. (2) Each unit should have at least one sensor which can be triggered by a hamster, and provides at least one type of feedback to the hamster, excluding visual and aural ones.
- have at least **two** different types of sensors and **two** different forms of feedback to the hamster.
- allow owner to interact with the hamster in the playground while they are away from home through mobile devices (i.e. a mobile phone, tablet or laptop) by controlling at least one interactive device over the Internet.
- be easy to clean and durable.
- be safe and avoid causing any harm to hamsters.

Remark:
You do NOT need to buy a hamster for this research, development or testing purpose.
If you own a hamster and would like it to trial your designed playground, please ensure that the hamster will not experience any pain, suffering, lasting harm or distress. The aim of the playground is to improve their health and well-being.

3. Mechanical clock which can show and tell time of day

Context

In many cities around the world, mechanical clocks are often found in public space. While the primary function of these clocks is to tell time, they also leave a memorable impression on those who see them, especially tourists.

To attract audiences, some mechanical clocks report time for every half hour and every hour on the hour in different ways, like start a performance with mechanical movement and sound.

Requirements

Design a mechanical clock for use in a public space, which

- does **not** involve the use of an electrical circuit and is **not** powered by electricity.
- works continuously without intervention for at least 4 hours.
- has a means to show the time of day visually (with second, minute and hour of the day, for 24 hours) and intuitively to its audience.
- provides a means to easily adjust the time of day (second, minute and hour).
- reports time for every half hour and on the hour, and makes a distinct sound to indicate the difference between half hour and on the hour.
- starts a performance with mechanical movement and sound on the hour, lasting at least 5 seconds.

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