

**Hong Kong Diploma of Secondary Education Examination 2023**  
**DESIGN AND APPLIED TECHNOLOGY**

**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 | Assembling mechanical toys is an effective way to help junior secondary students learn the working of different mechanisms.<br><br>Design a wind-powered two-legged walking toy. The toy must:<br><br>(a) use wind as its sole power source;<br>(b) be driven by mechanical means and not be equipped with any energy storage devices; and<br>(c) have at least three walking patterns, configurable from changes in the mechanism.   |
| 2 | An automatic cleaning robot prototype | When designing and developing an automatic cleaning robot, it is necessary to use a prototype to test its cleaning function.<br><br>Design an automatic cleaning robot prototype. The robot must be able to:<br><br>(a) clean a specific flat surface area of not less than 2m by 2m, without the need for continuous human control;<br>(b) collect dust, dirt and/or litter from the area into a container within a reasonable amount of time; and<br>(c) notify the user when the cleaning of the surface area is complete.   |
| 3 | A stroboscopic zoetrope learning kit  | Using object stop-motion animation to help primary school students understand the life cycle of insects is an interesting way of learning.<br><br>Design a stroboscopic zoetrope learning kit. The requirements are as follows:<br><br>(a) The kit must use the principle of stop motion animation, with the animation visible to the viewer directly under the strobe light.<br>(b) The animation should present smoothly the life cycle of a kind of insect, with at least 24 differently-shaped 3D physical objects.<br>(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 partial working 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.
- For details of the requirements and assessment criteria of this subject applicable to the SBA projects starting from 2021 HKDSE, please refer to:  
[http://www.hkeaa.edu.hk/DocLibrary/SBA/HKDSE/DAT-2021-Draft\\_Assess\\_Criteria-0318-E.pdf](http://www.hkeaa.edu.hk/DocLibrary/SBA/HKDSE/DAT-2021-Draft_Assess_Criteria-0318-E.pdf)

**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](http://www.hkeaa.edu.hk/en/sba/sub_info_sba/dse_subject.html?10)