Hong Kong Diploma of Secondary Education Examination
Design and Applied Technology
Reference Topics on SBA Project

Introduction:

The following topics were selected from the Project Lists of the former AS Level 'Design and Technology' Examination. Teachers may use the following topics as the HKDSE 'Design and Applied Technology' SBA Projects.

Suggested Topics on SBA Projects:

1. **Energy Saving Domestic Appliance**

   Energy saving starts at home.

   Investigate and analyse the energy consumption of one domestic appliance which uses any type of energy; oil, electricity, gas, etc. From the results of your study, redesign the appliance you selected, incorporate improvements which make it more efficient in terms of energy consumption. Your final design should be suitable for mass production to ensure that the appliance would be reasonable inexpensive.

2. **Litter Bin for A Park**

   In the park, a litter bin is primarily a piece of equipment for public use but it should also be considered as part of the landscape.

   Investigate the collection and disposal of litter in parks. From your findings, design and make a litter bin for a park. Assume at least fifty bins would be required.

3. **Modular Office Furniture**

   Modular office furniture has the advantage of being flexible so that the interior design can be varied.

   Investigate the situation of an office that you are familiar with to see how modular furniture could be utilized. Design and make a set of modular furniture which would meet the requirements of the specific situation of your study.

4. **Storage Device/ System**

   Personal computers (PCs) are very common in both offices and the home nowadays.

   Investigate the problems associated with the storage of computer floppy diskettes. Design and make a storage device/ system to solve the problem.

5. **Flat-pack Furniture**

Furniture which is sold as ‘flat-pack’ is becoming more popular. This type of furniture has the advantages of being able to be conveniently carried away in pack(s) and easily assembled with minimum technical skills.

Investigate and develop a piece of ‘flat-pack’ furniture for use in a living room of a public housing estate. You should include assembly instructions.

6. **Portable Workstation for Hobbyists and Handymen**

Investigate the feasibility of building a portable workstation for hobbyists and handymen working at home.

Specify a particular hobby or trade and design the workstation. The unit should accommodate the tools and equipment needed to perform the tasks for the hobby or trade you specified.

7. **Portable Equipment for Emergency Use**

Using your knowledge of electromagnetism, design and build portable equipment that can be used to generate either light, sound or heat for emergency use.

8. **News-stands**

Many local news-stands or stall on the streets are simple in design and inexpensive to manufacture, but they often lack a cover and are uncomfortable for the stall-keepers who have to operate the stall in all weather.

Investigate the user requirements of news-stands. From your findings, design and construct a model of a news-stand to be situated on the street just in front of a fast food or high-class seafood restaurant. The basic floor space allowed for the news-stand is 2m x 0.6m, but it is possible to extend this to 2m x 1m when the stand is open for business. You will therefore need a fairly compact design which uses valuable space to the best advantage. Stall-keeper must store the magazines and newspapers at night so you need to design your stand with this in mind.

9. **Small Trailer for Carry Camping Gears**

You often go camping on weekends. Camping gear is frequently heavy and cumbersome.

Study the structure of common bicycles. Design and make a small trailer for carrying camping gears which can be attached to a bicycle.

10. **Hands-on Museum Exhibit**

Many museums display exhibits that visitors are allowed to play with or operate.

Investigate and develop a hands-on museum exhibit to demonstrate the interesting aspect(s) of a scientific/technological principle/application.

11. **Automatic Cover for Drying Clothes**

Investigate the facilities used for drying clothes outdoors in public housing estate in Hong Kong. Design a system which will automatically cover the clothes when it rains. You may use a half-size scale model to illustrate your design solution.

12. **'Point of Purchase' Display Unit**

Products are today displayed in many shops on a stand, hung on the wall or arranged on a rack in order to encourage people to buy these products. These kinds of display are sometimes called 'point of purchase' displays.

A company wishes to introduce a new range of personal care products aimed at teenagers. You are asked to design and make a 'point of purchase' display unit, as well as labels and packaging, for a range of personal care products of your own choice. The display unit can either be free-standing, attached to the end of a row of shelves or be used next to other display units.

13. **Emergency Survival Kit**

Sometimes students in your school have to go on an adventure journey as part of their social and personal development programme. They have to go to a country park for a day and may have to stay overnight in the open if an unexpected dangerous situation arises.

As a designer, it is necessary for you to think about various dangerous situations they might encounter. Make a list of all the things needed in an emergency survival kit to be used for spending a night in the open to hold the supplies and equipment. Design and make a kit which has to be lightweight and hold the contents in a way that allows easy access. In addition, you must include easy-to-follow instructions on the proper use of the contents of the emergency kit. You should keep the writing to a minimum and use diagrams where possible.

14. **Bubble-blowing Machine**

Your class is going to organise a graduation party at the end of the school year. In order to enhance the festive atmosphere of the party, your class has decided to have a bubble-blowing machine to create special effects by blowing out streams of soap bubbles.

You are asked to design and make a bubble-blowing machine that can provide various predetermined effects accompanied by light, sound, movement, etc.

15. **Welcoming Device for A School Hall**

Your school is going to organise a Christmas party. To provide a warm welcome to the party-goers, a welcoming device is to be set up at the main entrance of your school hall.

You are required to design and make a welcoming device that achieves various predetermined decorative effects using movement, sound, light, etc.

16. **Shooting Game**

Many toys involve the use of scientific principles. You are required to study some scientific principles that can be applied to the operations of shooting games.

A company wishes to design a shooting game which involves shooting an object upwards to a minimum height of 3 metres using some kind of shooting device. Design and make the shooting game, giving special consideration to safety.

17. **Free-standing Tent**

Many young people like to go camping, where it is sometimes necessary to set up tents on very hard ground.

Design and make a free-standing tent that can be readily set up without the use of tent pegs. The tent should accommodate 1-2 persons and can be assembled and dismantled without the use of tools.

18. **Puppet Theatre**

Puppets are popular with adults and children all around the world. Throughout history puppet shows have been used to entertain people by presenting stories acted out by puppets.

You are required to write a short story on a particular theme, and design and make a puppet theatre with two or more puppets used to act out the story. The puppets should have moving parts controlled by some mechanical, electronic, hydraulic or pneumatic means and may have features such as flashing lights, rotating arms, etc. You are also required to design an automatic operation system for opening and closing the curtains of your model theatre.

19. **Wind Tunnel Model**

Engineers use wind tunnels to test the streamlining of different shapes in the design of aeroplanes and automobiles.

Your are required to design and build a wind tunnel model to use for demonstrating to school children the testing of the streamlining of different shapes of car or spaceship models. You are also required to design a chart/diagram to illustrate the working principles of your wind tunnel.

20. **Automatic Dispenser**

A dispenser is a machine which gives out one item at a time.

You are required to design and make a dispenser to use for selling a certain kind of consumable goods. You should specify what consumer goods are to be sold using your dispenser. The dispenser should be coin-operated, be able to contain a reasonable number of items to be sold and should release the items one at a time as a handle is turned or a button is pressed. The dispenser should be designed and installed in the new ‘Airport Express’ railway stations, so it should be functional as well as aesthetically pleasing.

21. **Jewellery Display Unit**

A display unit can help to promote the sale of jewellery.

You are required to design and make a set of jewellery composed of two items and a unit to display the set of jewellery. A pair of earrings is considered to be one item. In designing the display unit, you should consider the following criteria:

(a) the nature of the jewellery to be displayed;
(b) ways of promoting the sale of jewellery;
(c) the environment in which the display is to be placed;
(d) lighting;
(e) security.

Present your design considerations with annotated sketches, pictures and mock-up(s) together with the set of jewellery and the display unit.

22. **Automatic Material Storage and Retrival System**

Investigate automatic systems used in industry to store and retrieve materials.

Design and make a simulation model for an automatic material storage and retrival system that can transfer a particular type of material from one cell/rack to another.

23. **Waste Material Recycling Unit**

Many types of waste materials generated daily in schools such as paper, sawdust, aluminum cans and plastic containers could, if properly treated, be turned into (a) useful products (s).

Select one type of waste material and investigate methods of turning this waste material into another product/ other products. You are also required to design a suitable unit for recycling the waste material you have chosen and present your ideals using both 2D and 3D media.

24. **Model City Traffic System**

Design and make a simulation model of city traffic system that incorporates a system for controlling traffic. The control system should be able to regulate and respond to traffic flow. The model should not be larger than 1m x 1m in area.

25. **Sunglasses and Display Unit**

Design and make a series of three sunglasses and a display unit for promoting the sale of these sunglasses. In designing the sunglasses and the display unit, you should consider the follwing:

(a) the specific use of the sunglasses;
(b) the ergonomics of the sunglasses;
(c) ways of promoting the sale of the sunglasses; and
(d) the lighting and security for the display unit.

26. **Automated Toy**

Design and make an automated toy that can generate action(s) and sound when moving forward. The toy should also and turn around when it meets a barrier. You can design a toy which operates on land or a toy which operates on water.

27. **Automatic Feeding System**

Keeping goldfish is a hobby for many people.

Design and make an automatic system for feeding goldfish at appropriate preset time intervals. The system should be capable of being set for feeding at least six times at preset intervals.

28. **Multi-purpose 3-D Calendar Clock**

A 3-D calendar clock can be a decorative item on a desk.

Design and make a multi-purpose calendar clock to be placed on a desk. The clock should indicate the day, date and time. (You may use clock components bought in the market to indicate the time only.)

29. **Water-saving Flushing System**

Water can be saved if a water-saving flushing system is used for a domestic toilet.

Design and make a water tank model demonstrating a flushing system with which half of the volume of flushing water of a domestic toilet can be saved if necessary. When the tank is full, the system should be able to flush at half or full capacity.

30. **A Designer's Stationery Organizer**

A stationery organizer can help to better arrange a designer's drawing equipment.

Design and make a hand-carried stationery organizer for designers.

31. **A Waiting Area for an Indoor Bus Terminal**

Indoor bus terminals are usually poorly-ventilated, particularly during the summer.

Design and make a model of an enclosed waiting area for an indoor bus terminal with facilities for about thirty persons.

32. **A Float for a Festival Parade**

A festival carnival parade is an important event used to promote tourism during major festivals.

Design and make a model float including light and sound effects. It should also include a rotating/revolving/oscillating platform.

33. **A Rubbish Collection Boat**

A rubbish collection boat can help keep the harbour clean.

Design and make a model boat for collecting rubbish from the harbour. You should use a 'working model' to illustrate the working principle(s) of the collecting device of the boat.

34. **A Butterfly Park Entrance**

A butterfly park can attract tourists and can be a learning place for children.

Design and make a model of a butterfly park entrance. You should produce at least six artificial moving butterflies to be placed at the entrance of the butterfly park.

35. **An Artificial Island Park**

An artificial island park can become a landmark for tourists and a place for children to play.

Design and make a model of an artificial island park with a floating bridge linking the island park to the mainland. You should illustrate the structure of the floating bridge and also the public facilities of the park.

36. **Decorative Jewellery and Display Unit**

Body jewellery can be fun for the young generation.

Design and make a series of three pieces of decorative jewellery for the human head and a display unit for promoting self-designed artificial jewellery for the young generation.

You are required to illustrate the following:

(i) The use of photos to show the effect of the jewellery when being worn onto the human head.

(ii) The lighting and security for the display unit.

37. **A Tram Terminal**

A new tram terminal can modernize the tram service in Hong Kong.

Design and make a model of a tram terminal for the main station next to a shopping mall. (You may use tram models bought from the market.)

38. **A Water-mill System for a Green House**

Water-mill is a classic irrigation system for planting.

Design and make a water-mill system for a green house. You are required to illustrate the irrigation system with pre-set intervals for your green house.