

Design Brief

1. Introduction:

In 1908 Antarctic explorer Robert Falcon Scott presented his view that man-hauling to the South Pole was impossible and that motor traction was needed. At that time snow vehicles did not yet exist leading his engineer Sir Reginald Skelton to develop the concept of a caterpillar track for snow surfaces. This revolutionary innovation set the stage for future development of the All-Terrain Vehicle (ATV). Originally developed as utility vehicles, advances in engineering design and technology since then, have provided manufacturers with the scope to produce a full range of recreational and competition versions of the ATV. Inventions such as the Track 1 all-terrain electric skateboard, developed by Flux Design Company and the DTV Shredder produced by the DTV Motor Corporation have extended the boundaries of technological innovation. These extend the best characteristics of traditional skateboard sports, into an exciting new powersport.

Design a model Electric Tracked Skateboard to the general specifications below.

The board should be your own unique design and should:

- (a) Have a tracked propulsion system.
- (b) Incorporate a front wheel steering mechanism.
- (c) Include fold-down utility handlebars.

Presentation of the completed project should ensure that:

- (a) All main operating features are clearly visible without dismantling.
- (b) The longest dimension does not exceed 400 mm.
- (c) Electric power does not exceed 9 volts.

Special Note: Modified toys or recycled projects are not acceptable.

2. Design Process (40 marks)

A design folio must be compiled which will detail your:

- (a) Analysis of the given brief and investigation of possible solutions; Note: When using research sources, including the internet, the sources must be acknowledged. Research material directly copied from the internet or from other sources and presented as your own work will not receive any marks.
- (b) Criteria for selection of your own individual solution:
- (c) Production drawings/plans; Note: Where computer aided manufacture (CAM) is used, supporting CAD files/drawings must accompany the design folio to authenticate your own individual work.
- (d) Testing and evaluation of your design solution.
- (e) Special instructions, if required, regarding the testing of the solution by the examiner.

Note: Marks are awarded as shown in Marking Scheme (Page 4 of 4). Computer-aided design (CAD) should be used where possible.

3. Design Realisation (110 marks)

Using appropriate materials and processes, make the model according to your own individual design plans. Computer aided manufacture (CAM) technology should be used, where appropriate, to enhance manufacture. You are expected to demonstrate a range of appropriate skills to manufacture and assemble all the parts, subject to the following guidelines:

- (a) Standard components may be used to support the assembly and interconnection of various parts.
- (b) Unnecessary recycling will result in lost marks. Recycling will be acceptable only in cases where a complex part cannot readily be made in the school.
- (c) Bought-in electronic solutions will result in lost marks.
- (d) Adhesives, if used, should be applied sparingly.

Note: Marks are awarded as shown in Marking Scheme