Category 3: Engineering

Engineering is the application of Science, Mathematics and Technology to invent new products or modify existing products that benefit society.

Inventions are original applications of technology that solve a problem. The scope for inventions is limited only by your imagination. You are asked to apply your knowledge of science to make a working invention that has a practical application. Your invention may be a new device, method or process that has not existed before or you may choose to look at an existing device and invent a solution that works better.

Finalists in this category may be eligible for selection into the **BHP Billiton Science and Engineering Awards**.

Designing an engineering project involves:

- choosing a problem to solve
- researching ideas or gathering information to help you solve the problem
- sketching and writing down several ideas that satisfy your requirements.
- selecting and developing the idea that will best solve the problem.
- identifying any risks to yourself and others during the making and using of the model*
- making a model of your invention
- testing the model to see if it solves your problem
- evaluating your model to consider any improvements that could be made

** It is important that a risk assessment is completed before conducting the engineering project. A **Risk Assessment Form** is required to be submitted with the entry.*

A successful STS Engineering entry:

- will show creativity and resourcefulness
- will show skill in construction and design
- will communicate ideas clearly

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Entry guidelines

Tick that you have satisfied each of the requirements below.

Content

Your entry should include:

- ☐ entry label attached to the top right-hand corner of title page
- ☐ written report following the headings described below
- ☐ Risk Assessment Form
- ☐ video on USB stick if not submitted online (ensure entry number is written on USB)

You must include with your invention a written report which includes the following parts.

- ☐ ***Title page and Table of contents***
- ☐ **Summary -** *What gave you the idea? Explains how it solves a problem. Explains what is original or new about your idea.*
- ☐ **Objective -** *Sets out the problem being solved. Explains its importance/relevance.*
- ☐ **Unique characteristics -** *Explains why it is unique.*
- ☐ **Advantages and limitations -** *Describes its the physical characteristics. Describe, in dot-point form, its the advantages and limitations.*
- ☐ **Existing approaches -** *If there have been other approaches to the problem, list them with a brief description of the main reason why these are inadequate.*
- ☐ **Sketches and diagrams -** *include sketches or drawings of your design.*
- ☐ **Acknowledgements and references -** *A reference list must be included. You should list the books, journals and websites you referred to and the people who gave you help or advice. State the contribution of people who provided help and advise.*

Presentation

Written report

- ☐ When your report is finished ask your teacher or parent(s) to check your report to make sure it follows the guidelines.
- ☐ Your report should be typed on single sided A4 paper and stapled in the top left corner. The whole report may be placed in a plastic sleeve for protection. Do not bind or place in a presentation folder.

Video

A video, no longer than **THREE** minute in duration, of the invention in operation should be provided with your entry. The video should show:

- ☐ The problem you have chosen to solve. (i.e. how significant or complex the problem is)
- ☐ How it is used (i.e. ease of use)
- ☐ How it works (i.e. how well does it work)
- ☐ The design (i.e. is sturdy/well made or elegant)
- ☐ How well the invention addresses the problem.

The preferred video format is **MP4***. Each year a number of student entries are unable to be viewed due to incompatible formats. If formats other than MP4 are used your video may not be able to be viewed.*

The quality of the video itself will play no part in the judging, however, it is important that the judges can see and hear the work to assess it fairly.

Working model

- ☐ Your design must be original. It must be safe to operate in a crowded area and must have appropriate safety features (e.g. boilers must have correctly operating safety valves). Dangerous chemicals must not be used and rocket type inventions will not be judged.
- ☐ Your model must be no larger than 0.76m (depth) x 1.22m (width) x 1.0m (height).

Note: Finalists may be required to bring their working models to the awards presentation ceremony.
Working models should not be submitted with entries.