



Toy Design Competition 2019

Toy Design Category (Mars Space Exploration Vehicle)

1. Introduction

Space exploration has been a dream for many and with recent the technology development, Mars exploration and colonization by humans in the future is no longer an impossibility feat. With such exciting future ahead, you are being challenge to design a Mars exploration vehicle that could transport exploration equipment and/or humans to the planet.

By using 3D CAD modelling software, students can combine their creativity with science and technology to quickly create and modify their models in 3D. Most importantly, the skills acquired during the competition will provide students with the basic knowledge of digital fabrication and enable them to create beautiful desktop display models using 3D printing or 2D slicing technology.

This Toy Design Competition 2019 is organised by the Singapore Polytechnic's School of Mechanical and Aeronautical Engineering.

2. Competition Rules

- 2.1 This year theme is "Mars Space Exploration Vehicle".
- 2.2 Participants are to design exploration vehicle related to exploration or colonization of Mars. Besides having rockets for taking cargo to the Mars, there will be a need for the vehicle to transport people safely back and forth between Earth and Mars. You are encouraged to make clear how many people your space ship can hold and any unique features you have design in the poster.
- 2.3 The design models can be created using any 3D modelling software but preferably using Autodesk Fusion 360 and built directly using 3D Printer, sliced plan generated from Slicer for Autodesk Fusion 360 or other prototyping methods.
- 2.4 Participants will make their model using 3D printing, laser cutting, card/plastic/foam board, kapaline board, perpex or soft ply of approximately 2 to 3 mm thick (depending on size of model) to demonstrate the form and functionality of their design for exhibition purpose.
- 2.5 The completed physical model of the exploration vehicle can be disassembled, but it must not exceed the boundary of a plastic container box of size **280x150x90** mm. Size bigger than stated dimensions will be disqualified.
- 2.6 The competition is open to all Secondary School students in Singapore.
- 2.7 The number of students in each team should not exceed more than two.
- 2.8 Each individual or team shall submit only one entry.

3. Design Workshop

- 3.1 A 2-day Fusion 360 Workshop will be conducted to educate participants in using 3D modelling software for their design. It will be conducted in SP from **19th to 22nd March 2019**.

- 3.2 The Workshop will provide participants with basic concepts of 3D Modelling, Visual Enhancement and Static Rendering. Students will be guided through a walk-through project using **Autodesk Fusion 360** to create the model. Students will be fascinated by how they can easily use Autodesk Fusion 360 to create organic shape model by simple dragging and pulling actions. The software is cloud-based and free for students and educators. The 3D model created are to be converted to .STL format for 3D printing or using **Slicer for Autodesk Fusion 360** to generate multi-layered plan for making the physical model.
- 3.3 Participants interested for the Fusion 360 workshop are to register their interest to their teacher I/C. There are 2 workshop sessions conducted over 2 days on **19th – 20th March** and **21th -22th March 2019**. The teacher I/C shall collate and email the softcopy of Registration Form for the Design Workshop to Mr Alvin Tay (email: alvin_tay@sp.edu.sg) by **4th March 2019**. The softcopy of the Registration form can be found at: <https://www.sp.edu.sg/engineering-cluster/mae/life-@mae/toy-design-competition/2019>

4. Competition Details & Prizes

- 4.1 The submitted entries will be judged and ranked by a panel of judges formed by the Organising Committee.
- 4.2 The prizes are:
- 4.2.1 Individual
- 1st Prize \$500 Cash Voucher + Trophy for School
 - 2nd Prize \$350 Cash Voucher + Trophy for School
 - 3rd Prize \$200 Cash Voucher + Trophy for School
 - 5 Merit Awards \$100 Cash Voucher each
 - Commendation Awards for all deserving entries (\$50 Cash Voucher each)
- 4.2.2 School
- Best Fleet Award
- 4.3 All winning students will be presented with certificates.

5. Judging Criteria

Item	Judging Criteria	Weightage
A	Design Brief / Reflection	5%
B	Poster Design	15%
C	Innovative and Aesthetic Appeal of rendered model	30%
D	Design Process Skills and Functionality	20%
E	Quality of Built Model	30%
	TOTAL	100%



6. Registration & Final Submission

- 6.1 Participants are to register their interest to their teacher I/C. The teacher I/C shall collate and submit to the Organising Committee using the registration form available in the TDC.19 website at <https://www.sp.edu.sg/engineering-cluster/mae/life-@mae/toy-design-competition/2019>.
- 6.2 Closing date for competition registration is on the **2nd April 2019**.
- 6.3 All participants should submit their entries by **1st July 2019** for judging.
- 6.4 Each submitted final entry must include:
- The physical model inside the plastic container (\$2 box from Daiso).
 - A hardcopy of your poster in A4 size (please see poster information below).
 - **Softcopy of the following through download link (eg. Google drive, dropbox, wetransfer etc.):**
 - **All the files** in the project folder must be submitted. These include images file, part and assembly model (f3d, stp format) and built model (stl).
 - **One A2-size posters** in ppt format based on the given template which will be emailed to the teacher-in-charge or downloadable from website.
 - A short design brief and the participants' learning experience or reflection in less than 100 words.
 - Pictorial sketches of the design
 - Rendered/coloured illustration of the design.
- 6.5 The Space Exploration Vehicle Title and Name of School must be clearly labelled in the download link and on the container box.
- 6.6 All works submitted should be done by the students and should not have been awarded by the organiser of another similar competition before.
- 6.7 The Organising Committee or sponsor is not liable for infringement or abuse of any design as a result of entry in this competition or as a result of subsequent publicity.
- 6.8 Entries that do not meet the competition rules will be disqualified.
- 6.9 Registration for Fusion 360 workshop sessions are to be submitted by **4th March 2019**.

7. Announcement of Results

- 7.1 The winners and their ranking will be announced during the Toy Design Competition 2019 Prize Presentation Ceremony to be held in Singapore Polytechnic Auditorium **end of July 2019**. Participants and teachers will be informed on the exact date.
- 7.2 In the event of a tie, the Organising Committee reserves the right to redistribute the prizes.
- 7.3 All decisions made by the judging panel are final.

For more information and registration, please contact:
Toy Design Competition (Design Category)



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