

4x4 in Schools Technology Challenge – Enrichment Training Programmes

Introduction

The Land Rover 4x4 in Schools enrichment training programme is adapted from the training modules of the 4x4 in Schools Technology Challenge and is suitable for students aged 13 – 19 in Singapore schools.

The curriculum of the training module is customisable and suitable to be catered for the following segments of students:

- NT/NA Elective Modules
- Innovation Clubs
- Robotic Clubs
- STEM Applied Learning Schools

The training programme requires students to build a radio controlled four-wheel drive (4x4) vehicle to specifications and must successfully navigate and complete obstacles on an off-road test track as demanding as real off-road situations. The vehicle has to emulate the capabilities of a full size 4x4 vehicle.

Schools undergoing the training programmes can take part in the 4x4 in Schools National Finals (Singapore) for an opportunity to represent Singapore in the World Finals stage.

About the Competition

1. Aims

The ambition of the project is to raise awareness, interest and enthusiasm in engineering through the practical application of Design & Technology, Mathematics and Science.

The engineering industry requires creative, multi-disciplined individuals who are capable of problem solving through individual tasks and working in motivated teams. This project replicates a 'real-life' work situation where specialists come together to share intellectual and practical ideas to resolve a complex problem. The challenge is an excellent opportunity for students to work in design teams to gain an awareness and understanding of project management and other key skills.

2. Objectives

- To provide participants with a platform and opportunity to experience operations of 4x4 manufacturing companies.
- Provides an experience where students can develop and embed knowledge and skills which may be later required in further education or their chosen career.
- Is motivating, exciting, challenging and fun for both the students and adults involved.
- Provides young people with the opportunity to work as part of a team or independently to develop problem solving skills and techniques.
- Provides an opportunity for students to learn and develop through participation in a hands-on practical experience.
- Enables young people to gain an understanding and awareness of what engineering involves, encouraging them to actively think about a career within STEM.
- Integrates subject knowledge from key areas of the curriculum with the wider agenda of work-related learning, enterprise, key skills and personal development.

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Enrichment Training Outline – 20 to 25 hours Duration (Customisable)

1. Introduction

- History and facts about Land Rover
- Introduction to the Science/ Engineering of Land Rover
- Introduction to 4x4 in Schools Technology Challenge programme and competition
- Introduction of each member and their team roles
- Viewing of past 4x4 in Schools Technology Challenge competition resources

2. Team Identity:

- Understanding about Logo, Team Identity, Branding
- Designing and choosing Team Logo, Team Name, and Colours
- Presentation to the class (Verbal Presentation skills)
- Creation of Presentation Board

3. Car Design:

- Introduction to the use of Autodesk – Fusion 360
- Simple Model creation
- Creation of the 4x4 Body Shell
- Design of the car body and mechanical parts (optional) of the car structure

4. Car Manufacture:

Designing of car body shell via recycle materials + Assembly

- Each student to receive recycled materials for car body creation
- Students cut, fold and staple the basic car structure
- Design of the car body shell using recycled materials and assembly of the car

Colouring

- Each group to decide on colours for Team Colours
- Each student to design and paint own car body

5. Introduction and Building of Control systems

Understanding of the electrical and electronic components in

- Light sensor
- Tilt sensor

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6. Learning Journey – Raceworks Singapore

- Principles of vehicle set up
- Rock-Crawlers vs 4x4 off-road vehicle set up
- Actual race

7. The Business of 4x4 Land Rover

- Budgeting and Sponsorship
- Presentation to the class

8. Track Element Setup

- Understanding different Track Elements and the effect on the vehicles of the Competition
- Understanding the Rules and Regulation
- Creating obstacle course using 6 Track elements
- Trial Practices

9. Competition among teams

- Setting up of the Obstacle using different Track Elements
- Trial Practices
- Competition - navigate vehicles across the obstacle