

2022 SCHOOL'S HANDBOOK JUNKYARD CHALLENGE

ENERGY BREAKTHROUGH

16-20 NOVEMBER 2022 | MARYBOROUGH, VICTORIA

POWERED BY IMAGINATION

THE PREMIER SCIENCE, TECHNOLOGY, ENGINEERING AND MATHS, ACTIVE LEARNING PROGRAM

A PARTNERSHIP BETWEEN



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1. OVERVIEW

[Version 2022.02](#)

The 'Junkyard Challenge' within Innovations in Technology category provides a unique but accessible challenge for students of all ages to engage with a one-day activity in Maryborough during the Energy Breakthrough.

The Energy Breakthrough presents a unique opportunity for students to extend their learning experience beyond the boundaries of formal education.

The following specifications have been framed so that the efforts and experiences of all participants are maximised, to be bound only by the constraints of safety and the spirit of healthy, but friendly competition.

- [Any significant changes for 2022 have been highlighted and underlined in blue.](#)
- Key specifications that the Organisers wish to bring to the attention of Team Managers have been highlighted in **bold**.
- If changes are made to these specifications prior to the event, Team Managers will be notified via email and a new edition will be published on the website.
- The Energy Breakthrough Organisers have the final authority to decide if any team participates in the event, based on safety and their interpretation of the following rules.
- All enquiries regarding these specifications should be emailed to enquiries@eb.org.au

2. ENTRIES

Categories, Classes and Quotas

Category	Class	Quota
Junkyard Challenge	Primary school students in Years 3, 4, 5 & 6 (Class A) Secondary school students	12 Teams

Team composition

- All entries are to be team entries and must consist of current school students.
- All team members must participate equally in the assessments at the event in Maryborough.
- Teams in the Junkyard Challenge must have:
 - a team of four (4) students
 - at least half of whom must be female.

Category caps, changes and waitlists:

- A maximum of two entries per school will be accepted in Junkyard Challenge
- Additional entries from a school will be placed on a waiting list and will be notified if accepted into the event.
- Correspondence regarding the status of entries on a waiting list will be made directly to a Team Manager only.

3. ASSESSMENT

Overview

The Energy Breakthrough Junkyard Challenge is unique in that all teams must compete across the two areas of assessment: Design and Construction/Display and Presentation and Trials.

All sections must be attempted, and points are awarded in the following sections:

Junkyard Challenge

Section	Points
Design, Construction and Performance Test	100

It is the responsibility of each team to ensure they complete all appropriate sections.

Further details will be provided prior to the event.

Scrutineering & Safety

Junkyard Challenge designs will be observed during their construction for any safety issues.

4. Crafty Cranes



Challenge 1: Junkyard Challenge – Crafty Cranes Primary

Do you have creative problem solvers and budding engineers?

Ages: Open to Primary students in Years 3, 4, 5 & 6 (Class A)

Challenge: The Junkyard Challenge involves teams of 4 who will be provided with a range of materials useful to create an innovative structure that will move a 4 kilogram weight a distance of 1 metre horizontally from its start position. Crafty Cranes will present participants with the challenge to build a crane device out of the resources provided in a 90 minute construction session (1.5 hrs). Each team will have a star picket (fence post) securely driven into the ground to provide the base for their crafty crane.

Challenge 2: Junkyard Challenge – Crafty Cranes Secondary

Ages: Open to Secondary students in Years 7 – 10.

Class: B

Challenge: Teams of four students are given a mystery box of recycled 'junkyard' materials. Over 90 minutes they must work together as a team to create a device, or machine that will move 4 litres of water across a 1.5 metre gap, with only one significant base point or footing.

Equipment provided

The types of materials available will be a mystery to the teams, but they are likely to include recycled items – some useful, some not! It will be up to the team to decide which materials they would like to use and how they will build their structure.

Electric drills will be available to share in central locations.

Basic Pack:

EACH team will receive this BASIC PACK consisting of:

- Design pack: Paper & pencils.
- Retractable tape measure.
- Fine nib texta.

Tools:

- Scissors.
- Pliers.
- Hacksaw (2 blades)
- Retractable Stanley knife.
- Safety Glasses (2 per team).
- Cutting board (NOT TO BE USED INSTRUCTURE)

Connectors:

- Gaffer tape.
- Rayon cloth tape.
- Roll of thin tie wire.
- Zip ties.
- Bag of Rubber bands
- Ball of string.
- bike tubes

Junkyard Materials

- Materials will be available on the day to assist your construction! (*That's the mystery*)
- There will be a work station where several adults will supervise the children using the drills, spare Stanley blades also available.
- All team members will have their 'Tools and Equipment Licences' signed off by their supervising teacher /mentor prior to the event. Licences will be provided in term 4.
- All team members MUST display good occupational Health and Safety practices at all times – or risk being excluded from the event. (Safety glasses are a MUST when drilling).
- Optional: teams may display a team banner up to A2 size.

Process

- The teams will start with a 10-minute discussion time and then have 80 minutes to build their structure. Then teams will check their structure against the criteria.
- Each team may bring a mentor with them to help during the discussion phase and to assist in the sharing of ideas, supervise students and maintain safe practice.
- After the first 20 minutes of build time all adults must step back into advisory roles only.
- Points will be deducted for adult intervention after this initial 20 minutes period.
- Please respect that this is a thinking-doing-learning engineering experience for young people.
- The Mentors could be a parent/teacher. If the team is unable to organise a mentor, please let the Planning Committee know prior to the event.
- Students may Barter & Swap what is in the junkyard collection during the time.

Finished Product

The structure MUST be able to support a 4 litre bottle of water (4kgs). Presentations will be made immediately after the test period is completed.

Judging Criteria:

A judging rubric will be emailed to participating schools in Term 4.

“The Best Crane Trophy”

Judges will be looking for the structure that resolves the task, effectively and elegantly. Fitness for purpose and aesthetically pleasing, will win the day.

Special Award – “Working under Pressure”

For the team that has demonstrated throughout the entire project – consistently sharing ideas & tasks and therefore working together to solve issues as they arise. Your machine may not work the best, but you could be the best working team.

Useful ideas

As this challenge requires students to respond in diverse and interesting ways, it is suggested that participants utilise the internet to gain insights and options as to how they might respond to the project task, in the lead up to the event. Information is power.