

PROPULSION 5.0

INTRODUCTION: Have you ever dreamt of flying your own fuel powered rocket which is simple, safe & exciting? Then we bring you the ideal platform for showcasing your understanding, Take your first big step to propel yourself into the world of aerodynamics!

Water Rocket is a mechanical event that involves the fabrication of a rocket whose fuel/thrust for flight is obtained by the use of water that is expelled at a large air pressure. It is an example of Newton's third law of motion. The pre requisites for such an event would be a basic knowledge of fabrication, materials and physical calculations involving thrust, air pressure, etc. The event tests a couple of aspects of the Rocket's flight. These include range, time of flight and accuracy of the launching mechanism.

FORMAT: The event consists of three rounds. First one is eliminatory, second is qualifying round and third is the final round.

- **First round: Range test**

Here the maximum range is tested. The distance between the launch pad and the point of landing is measured and taken to be the points in that round. From this, 30% team will be shortlisted for the next round.

- **Second round: Flight test**

In this round the teams whose rocket will remain in air for maximum time will get maximum point. The participants can even launch their rocket according to them.

- **Third round: Battle of rockets**

Each team will be having two chance. The maximum score that a team can earn is 200 points in this round that can be scored by hitting the rocket

At a distance of 70m from the launch pad, a target is placed. Target contains concentric circles of radii 2m, 4m and 6m. If the rocket lands at the center, team gets 100 points, second ring 75 points, and outer ring 50 points. If otherwise, no points are awarded. In the case of any tie, the time of flight will be noted and the team with the least time will win the first prize.

RULES:

- A team may consist of a maximum of 3 member.
- The rocket and its components must be handmade. No readymade rocket is allowed.
- The rocket body should be made only with plastic bottles of aerated soft drinks of maximum capacity 2.5L and should be free of any fabrication failures or dents

caused by heat exposure. More than one bottle can be used but the total volume must be less than 2.5L.

- The water rocket must use only compressed atmospheric air as its source of energy. Pressure compressors (foot pump) shall be provided at the venue. The pressure inside the container (rocket body) before launch should NOT exceed 70 psi in all rounds.
- Water to be filled in the rockets will be provided by the organizers. Calculations regarding amount of water to be used is left to the choice of the team.
- Two trials will be given to each team and best of two will be taken into consideration.
- The rocket must be launched from a stationary position using a fixed launch pad. Slingshots, trebuchets, catapults, cannons, and all other devices that may assist launching are strictly prohibited. In other words, the internal pressure of the rocket must be the only source of energy for the rocket.
- Use of electronic components and chemical explosives are banned.
- The point where the rocket hits the ground first will be taken as the point of landing and measurements will be taken considering this point.
- Teams are advised to get more than one water rocket, in case of any damage to one. But the water rockets must be identical.
- The team will be disqualified/given another chance to remodel if the model is found to be dangerous in anyway. Decision of the organizers is final and binding.

NOTE-These rules are intended to keep everyone safe, but not prevent innovative and imaginative solutions.

JUDGMENT CRITERIA:

1. The final judgment is based on the total points scored by the participated team in all the three rounds described above.
2. The points are also given to the teams based on their creativity and simplicity in making the water propelled rockets; this will be decided at the time of the event by the event manager by viewing their rocket samples.
3. The total points scored in all the three rounds are added up and awarded as their final score.