WATER ROCKET

EVENT DESCRIPTION

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.

EVENT FORMAT

The event consists of only ONE round ie Range Test.

Range test

Here the maximum range is tested. The distance between the launch pad and the point of landing is measured (in meters) and taken to be the points in that round.

PROBLEM STATEMENT

Design a water rocket that is completely powered by the thrust delivered by water expelled at high pressure.

RULES

1. Max 3 participants.
2. The rocket and its components must be handmade. No readymade rocket is allowed.
3. 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.
4. A common launch pad shall be provided.
5. 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 60 psi .
6. 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.

7. Two trials will be given to each team and best of two will be taken into consideration.
8. 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.
9. Water rockets can have multiple stages. Parachute, gliding mechanisms are permitted.
10. Use of electronic components and chemical explosives are banned.
11. 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.
12. Teams are advised to get more than one water rocket, in case of any damage to one. But the water rockets must be identical.
13. The participants are allowed to use variations of their water rockets in different rounds. However, only one design must be maintained throughout a single round.
14. 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.

JUDGING CRITERIA

- The judgment is completely based on the marking scheme mentioned in the event format.
- The organizers decide to permit the launching of the rocket after inspection of both the rocket and launch pad considering factors such as safety and permissible mechanisms mentioned in the rules. In such cases, the organizers' decision is final and binding.

FAQs

Q) How many trials will I get?
Each team would be allowed only two trials.

Q) How much time will be given for one launch?
10-15 minutes

Q) Will I get an additional trial if the rocket fails to launch i.e. if the rocket doesn't leave the Launchpad itself?
You wouldn't get any additional trial unless you have one trial left out of the two allowed trials.

Q) Are we allowed to repair our models if it gets damaged on the spot?
Yeah, if you can manage to do it within the prescribed time limit permitted by the organizers.

Q) Can we make changes to our model before launching?
Yeah, but if you exceed 15 minutes you would lose your one trial.

Q) Are more than three members allowed?
No, the max number of participants should not exceed three at any cost.

RESOURCES FOR LEARNING

1. http://www.aircommandrockets.com/flying_higher.htm
2. http://www.sciencetoymaker.org/waterRocket/buildWaterRocketLauncher.htm
3. https://www.youtube.com/watch?v=1t663D_gErg
4. http://www.waterrocketmanual.com/how_they_work.htm
5. http://www.txsnapper.eezway.org/txsnapper/tips.html
6. http://www.npl.co.uk/upload/pdf/wr_booklet_print.pdf.

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