WORLD SPACE WEEK 2026

WATER ROCKET CHALLENGE

SCHOOL-LEVEL COMPETITION

ORGANISED BY

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OFFICIAL COMPETITION GUIDELINES

Technical Specifications, Rules & Regulations, and Judging Criteria

Document Type	Competition Guideline — Official Release
Category	School Level (Classes as notified by the Organizing Committee)
Event Window	4th October 2026
Venue	Haldwani, Uttarakhand
Organized By	Astroverse Experience Pvt Ltd

1. Preamble

Astroverse, in association with Astropathshala, is pleased to host the Creative Hydro Rocketry Challenge as part of the school-level programme for World Space Week 2026. The competition invites young innovators to apply core principles of aerodynamics, fluid propulsion and structural engineering to design, construct and launch a water-propelled rocket.

This document constitutes the official guideline for the competition and shall be binding on all participating teams, mentors and accompanying faculty. Participants are advised to read this document in its entirety prior to registration and to retain a copy for reference throughout the competition cycle.

2. Objective

Each participating team shall design and launch a water-propelled rocket that demonstrates effective use of thrust, aerodynamic stability and creative engineering, in accordance with the technical specifications and safety protocols set out in Section 4 and Section 6 of this document.

3. Eligibility & Team Composition

- Teams must register within the official registration period (15 August – 20 September 2026)
- Eligible classes / grade bands: Class 4th onwards
- Team size (minimum and maximum members per team): 1–3 students
- Participants must comply with all technical, safety and launch instructions issued by the Organizing Committee and Technical Team.

4. Technical Specifications

4.1 Approved Rocket Airframe

Participants shall construct the rocket body using one of the following organizer-approved carbonated-beverage PET bottles:

- 750 ml PET bottle (e.g., Sprite, Coca-Cola)
- 2 L PET bottle (e.g., Fanta, Sprite, Coca-Cola)

Any alternative 750 ml or 2 L carbonated-drink PET bottle proposed by a team is permissible only upon prior inspection and written approval of the Organizing Committee.

4.2 Launcher Interface

Parameter	Specification
Launcher nozzle diameter	22.5 mm
Bottle–launcher compatibility	Mandatory; must mate with the official launcher supplied at the venue
Securing of rocket	The rocket must be securely mounted on the launcher before pressurisation commences

4.3 Permissible Customisation

Within the constraints of Section 4.1 and Section 5, teams may customise the following elements of their rocket:

- Bottle / body configuration (single-stage or multi-bottle assembly)
- Fin configuration — three (3) or four (4) fins
- Fin geometry and fin material
- Nose cone design
- Payload (where permitted by the Organizing Committee)
- Decorative elements
- Recovery and design features, where permitted

4.4 Propellant & Additives

Water shall serve as the sole primary propellant. The exact fill quantity shall be specified by the Organizing Committee on the day of the competition and shall be uniformly enforced across all teams.

Where the Organizing Committee permits the use of atomizing additives, teams may select only from the following organizer-approved substances, and only under the direct supervision of an authorised instructor or technical official:

- Common salt
- Liquid detergent
- Baking soda

> *Safety Note: No flammable, toxic, corrosive or otherwise hazardous additive shall be introduced into a pressurised vessel without explicit prior written approval from the Organizing / Technical Committee. Isopropyl alcohol, in particular, shall not be treated as a routine, student-selectable additive in a pressurised school rocket unless the Organizing Committee has instituted a specific, professionally supervised safety protocol governing its use.*

4.5 Launch Parameters

Parameter	Specification
Standard launch pressure	110 PSI, regulated and controlled exclusively by the official Technical Team
Pressurisation authority	Only authorised Technical Team members may operate the pressurisation system

5. Mandatory Pre-Launch Preparation Protocol

Every team shall complete the following five-stage preparation protocol prior to entering the launch queue. Failure to complete any stage shall render the rocket ineligible for launch until rectified.

5.1 Seal & Reinforce

Teams shall inspect all joints, attachments and seams of the rocket body. Reinforcement may be applied where structurally necessary; however, no modification shall compromise the structural integrity of the pressure vessel.

5.2 Aerodynamic Stability Test

A balance and stability assessment shall be performed prior to flight. As a governing principle, the Centre of Gravity (CG) of the assembled rocket must remain forward of (ahead of) the Centre of Pressure (CP) to ensure stable flight.

5.3 Rocket Identification & Labelling

Each rocket shall be clearly and legibly labelled with the following information prior to inspection:

- Team name / team code
- School name / school code
- Bottle capacity (750 ml / 2 L)

5.4 Propellant Filling

The rocket shall be filled with the organizer-prescribed quantity of water at the designated filling station. Once filled, the rocket shall remain sealed and under the direct control of an instructor or Technical Team member until the moment of launch.

5.5 Final Technical Inspection

Every rocket shall undergo and successfully pass the official safety inspection conducted by the Technical Committee before being admitted to the launch queue. Rockets that do not pass inspection shall not be permitted to launch until the identified deficiencies are rectified and re-inspected.

6. Safety Regulations & General Rules of Conduct

The following rules apply to all participants, mentors and accompanying faculty for the duration of the competition:

- All participants shall comply with instructions issued by the Organizing Committee and Technical Team at all times.
- Only authorised personnel shall operate the pressurisation and launch systems; participants shall not attempt to pressurise or trigger launch mechanisms independently.
- All spectators and non-launch personnel shall remain behind the designated safety line during pressurisation and launch.
- Use of unapproved, hazardous, flammable, toxic or corrosive materials in the construction or propulsion of the rocket is strictly prohibited.
- Any rocket found to be structurally unsafe, or in violation of the specifications in Section 4, shall be disqualified from launch at the sole discretion of the Technical Committee.
- Decisions of the judging panel and Technical Committee on all technical, safety and scoring matters shall be final and binding.
- Any act of misconduct, unsportsmanlike behaviour or interference with another team's equipment shall result in disqualification.

7. Judging Criteria & Scoring

Each rocket shall be evaluated by the judging panel against the following criteria:

7.1 Range

The horizontal distance from the designated launch point to the rocket's landing point shall be measured and recorded for each flight.

7.2 Aerodynamic Stability

The judging panel shall evaluate the following aspects of flight performance:

- Smoothness of trajectory
- Minimal wobbling during ascent
- Proper fin alignment
- Controlled flight path
- Stability maintained throughout the flight duration

7.3 Creativity & Engineering Design

The judging panel shall evaluate each entry on the following design parameters:

- Originality of design
- Efficiency of overall design
- Appropriateness of material selection
- Quality of fin and nose-cone design
- Soundness of engineering reasoning, as reflected in the Project Report
- Effective integration of optional features (payload, recovery, decorative elements)

7.4 Determination of Winner

The rocket demonstrating the highest range, provided it exhibits safe and stable flight, shall be awarded the highest ranking. In the event of a tie, superior aerodynamic stability, as assessed by the judging panel, shall serve as the tie-breaking criterion.

8. Project Report Submission

Submission of a Project Report is mandatory for every participating team. Each team shall complete the report corresponding to the Creative Hydro Rocketry Challenge and submit it within the timeline notified by the Organizing Committee.

8.1 Report Content

The report shall document the team's design approach, construction process, testing procedure, modifications undertaken and final flight performance. Teams are encouraged to include sketches, photographs, tables and recorded observations wherever applicable.

8.2 Submission Requirements

- Online Submission: The completed Project Report shall be submitted online prior to the competition, by the date specified by the Organizing Committee.

- Competition-Day Submission: Each team shall bring one printed copy of the submitted report to the competition venue on the day of the event.
- Final Details & Specifications: Final rocket height, mass, dimensions and other results shall be recorded and verified on the competition day, following presentation of the rocket for inspection.
- Physical Submission: The completed and verified physical copy of the report shall be submitted to the Organizing Committee following inspection.

> *Important: The Project Report must be prepared strictly in the prescribed format issued for this challenge. Teams must ensure that the online submission and the physical copy submitted on the competition day correspond exactly to the final competition entry.*