BOTTLE ROCKETS

DESCRIPTION; Prior to the tournament, teams construct and test up to two rockets designed to stay aloft for the greatest amount of time.

TEAM OF UP TO: 2 IMPOUND: No EYE PROTECTION: Safety Spectacles TIME: 10 min.

1. EVENT PARAMETERS:

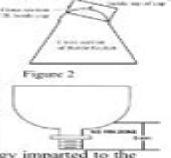
- a. Teams must design, build, and bring up to two rockets to the tournament (only 1 launch allowed per rocket). Parts from one rocket must not be used on another rocket. Teams must wear eye protection during the loading, launching, and retrieving of their rockets. Teams may also bring their own funnels, measuring devices and other necessary tools to prepare their rockets.
- Event supervisors must provide the launcher and water. They may also provide funnels and measuring devices.

2. CONSTRUCTION PARAMETERS:

- a. PRESSURE VESSEL: The rocket pressure vessel is the part of the rocket that attaches to the launcher and is filled with water and air. The pressure vessel must be made out of a single 2-liter or less plastic carbonated beverage bottle with a neck/nozzle opening internal diameter of approximately 2.2 cm (a 1/2 inch Schedule 40 PVC pipe must fit tightly inside the nozzle opening).
 - LABELS may be removed from the bottle but labels must be presented at the safety inspection to prove the bottle is carbonated. Rockets without labels must not be launched, this is a safety issue.
 - PLEASE NOTE: Many soda manufacturers have recently changed their bottles. The inside of the neck of the bottle now has a ridge that will prevent the bottle from going on the launcher on many brands. See the event help webpage for assistance in checking if yours will fit.
 - STRUCTURAL INTEGRITY: The structural integrity of the pressure vessel must not be altered. This includes, but is not limited to: physical, thermal, or chemical damage (e.g., cutting, sanding, using hot or super glues). Alteration to the structural integrity of the pressure vessel is a safety violation of the rocket and it must not be launched. Event supervisors must assess the structural integrity by looking through the nozzle and sides of the bottle for discoloration, bubbles, thinning or cuts in the walls. Rockets violating this rule must not be launched, this is a safety issue.
- b. MATERIALS: Only tape must be used to attach fins and other components of the rocket together. Glues of any type must not be used anywhere on the rocket. Metal of any type and commercial model rocket parts are prohibited anywhere on the rocket. Rockets violating this rule must not be launched, this is a safety issue.
- c. NOSE CONE: Rockets must use a blunt or round nose with a minimum radius of 1.25 cm, for safety (see Figure 1). Teams must not use a nose that is sharp, pointed, or consisting of a rigid spike regardless of the material used. Rockets violating this rule must not be launched, this is a safety issue.
- d. FINS and OTHER PARTS: Fins and other parts added to the pressure vessel must be 5 cm or higher above the level of the bottle's opening to ensure rockets fit on the launcher (see Figure 2).
- e. ENERGY SOURCE: Explosives, gases other than air, chemical reaction, pyrotechnics, electric or electronic devices, elastic powered flight assists, throwing devices, remote controls and tethers are prohibited at any time. All energy imparted to the rocket at launch must originate from the water/air pressure combination. Rockets violating this rule must not be launched, this is a safety issue.
- f. RECOVERY SYSTEM: Any free-fall recovery system is allowed provided it does not violate any other rule; however, the recovery system must be judged as safe. Example: a parachute.

3. THE COMPETITION:

- a. All rockets must be launched using the launcher and water provided by the supervisor.
- b. Only one launch is allowed per rocket. If a team wishes to use both launches, they must have 2 rockets.



Rules For The 2014 Science Olympiad

Vlad A. Neacșu

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