BUNGEE DROP

Read the General Rules in the manuals and on www.soinc.org as they apply to every event.

1. **DESCRIPTION**: Each team will design one "elastic" cord to conduct two separate "drops" at a given height(s) and attempt to get a drop mass placed in a bottle as close as possible to, but without touching, a landing surface (plane).

   A TEAM OF UP TO: 2 **IMPOUND:** Yes **TIME**: approximately 15 minutes

2. **EVENT PARAMETERS**:
   a. Teams must provide one "elastic" cord to be used for both drops that terminates with a closed metal ring approximately 1/2 to 1 inch in diameter (e.g., a key ring) that will not open and may bring their own measuring devices, to confirm heights, length or mass **during** the time given for **preparing** their two drops.
   b. Supervisors will supply a drop mass (**50-300** grams) that will be placed in a 500-591 mL **plastic** bottle and is the same for both drops, an attachment mechanism (hook, clasp, carabiner, etc.) that will connect the team's **bottom** cord ring to the bottle and a top anchoring system/extended platform with a release mechanism (e.g., a clamp) to attach the **top end** of the elastic cord, which all teams must use. At Regionals, the mass will be in multiples of 25 grams, at State the mass will be in multiples of 10 grams, and at Nationals it may be any mass. The bottle's total mass value and length, including the attachment mechanism, will be **posted immediately** after impound.
   c. Supervisors must provide an accurate system for determining how close a team's device came to the landing surface (plane), and whether or not it touched. Some successful methods for determining the closeness of a drop to the landing surface (plane) include multiple spotters or digital video cameras. Possible methods for determining whether the device touched or broke the landing surface (plane) include a carbon paper drop area or a very fine powder landing area.
3. **THE COMPETITION:**
   a. The Drop: Teams will be given a total of 5 minutes to prepare their device in the holding area, followed immediately by 5 minutes to complete both drops.
   b. The drop heights: both "drop heights" will be between **2-5** meters (at Nationals the drop heights will be between **5-10 m**). At **Regionals and State** the 2nd drop height may be the same or different. **At National the drop heights will be different.** The exact height from which the drop must occur will be verified by at least two separate measurements by the supervisor. The **drop height values** and drop instructions will be **posted immediately** after impound.
   c. Elastic cords must be **impounded** prior to posting the bottle's length and total drop mass value and drop height(s). No physical alterations may be made to the elastic cord once it has been impounded (with the exception of marking drop locations on the cord before the drops). Any team that fails the "elasticity test" will be allowed to compete, but will be ranked behind all teams which pass the test. The cord may consist of more than one material (contest rubber, nylon, latex tubing, thread, sewing elastic, metal springs, etc.) and more than one strand as long as it meets the elasticity test. The operational definition of elasticity for this event is: while being suspended vertically, the bottom meter of the cord must stretch to at least 1.25 meters when a single 500g mass is attached to this section and return to approximately its original length after the mass is removed. "Self-limiting-brake" mechanisms such as a separate, parallel, non-elastic strand that "brakes" the fall of the mass with little to no rebound are not permitted.
4. **SCORING**:
   a. The final score will be the sum of the distances between the lowest point of the bottle and the surface (plane) for each drop. The team with the lowest total distance for the two drops will be the winner.
   b. Teams with one drop that touches the landing **surface** (plane) will be ranked below those that have no touches. Teams with two touches will be ranked below those teams with one touch. Teams that failed the elasticity test will rank below all those that passed the elasticity test.
   c. If there is a tie, the team with the single best drop overall (closest to the landing **surface** (plane) on either drop) will win. **Second tiebreaker is the cord with the greatest stretch in the elasticity test.**

Recommended Resources: All reference and training resources including the **Problem Solving and Technology CD** are available on the Official Science Olympiad Store or Website at www.soinc.org