PRECISION PING PONG PROPULSION

DESCRIPTION: Students will design, construct and test a launching device to propel ping pong balls at a target that is placed within a given range.

TEAM SIZE: 1 or 2 students

APPROXIMATE TIME: 15 minutes

THE COMPETITION:

1. Students are to design, construct, test and demonstrate at the tournament a launching device. This device should be capable of accurately and consistently shooting a ping pong ball a range of distances. A new launcher must be designed and built by members of this year’s Science Olympiad team. Devices from previous years may not be used.

2. Safety goggles must be worn during the competition. Teams without goggles will not be allowed to shoot. Standard eye glasses are not an acceptable substitute.

3. Launching Device:
   - There are no material or size restrictions for the launcher.
   - The balls must be launched by releasing the stored energy of some elastomeric material (rubber band, inner tube, etc.). Launchers incorporating any electrical components, compressed gas, liquid or metal springs are forbidden.
   - Balls must be loaded and launched individually. No auto loading magazine or multi chambered device may be attached to the launcher. Only one ball at a time may be in the launcher.
   - **All devices must sit upon rubber or soft material “feet” to prevent floor damage when being moved.**
   - The device must be marked with the team name and number.

4. Ping pong balls:
   - The team may bring a total of fifteen (15) regulation 40mm Ping-Pong balls.
   - Ten (10) balls may be white; five (5) balls may be orange. One (1) of the orange balls should be marked with a black band completely around the circumference using a permanent marker. No other alterations are allowed.
   - Each ball must be clearly marked with their team number in two places on opposite sides using a black permanent marker.
   - Please underline the team number on each ball to aid identification. **This applies to all teams.**
5. Impound:

   **At least one competing student must be present for impound.** All materials that the team will use must be impounded at the beginning of the tournament. This includes:
   - Launch device (including anything required to prepared or adjust the device before or during the shoot)
   - Up to 15 ping pong balls packaged in a clear plastic, closeable bag
   - Practice Log
   - Goggles are not required to be impounded, but are required to compete.

6. Practice Log:
   - The team should submit, at impound, a practice log on standard 8 ½” x 11” sheet(s) of paper. It should be labeled with the school name and team number. **The Practice Log will not be returned. Do not submit your only copy.**
   - The data in the Practice Log may be of any presentation style (e.g., handwritten, typed), any format (e.g., graphs, tables) and any display style (B&W or color).
   - The practice log should include a minimum of three variables **and 20 launches** related to launch performance. Examples of appropriate variables might include:
     - Score
     - Distance to the target
     - Elevation or angle of shooting
     - Stretched elastomeric membrane length
     - Type of Elastomeric membrane
     - Size of Elastomeric membrane
     - Other attributes not specifically not listed here but deemed necessary by the Shooting Team to describe the performance of their launcher

   **A Practice Log which meets minimum requirements will be awarded 50 points.** They will also be judged in terms of data completeness, clarity, and depth, as part of the tie-breaking process.

7. The target is a 5-gallon plastic pail with the handle removed (approx 12in. dia. x 14 ½ in. high) placed at the center of an inflatable wading pool (approx 49 in. inside dia. x 58 in. outside dia. x 13 in. tall). The pool bottom will be covered in a layer of foam rubber about 1” thick.

8. The launch line will be marked on the floor at any of the half-meter intervals, 4 to 8 meters from the center of the target. A starting line will be marked approx 2 meters back from each launch line.

9. The target and launch area will be on a hard surface such as a tiled floor or hardwood gymnasium floor.

10. The participants will be notified of the distance to the target at the time of their individual shooting round.
11. The teams will wait with their launcher behind their assigned starting line. When they hear the Event Supervisor’s whistle all teams advance to their launch line, set up their launcher and “commence firing at will”. No part of the launcher may extend beyond the back edge of the launching line. Back edge is defined as the edge furthest from the target.

12. No participant may manually weigh down or manually support the front edge of the device during active shooting. Students should stay behind the launching line.

13. A total of 4 minutes are allowed to set up and launch all 15 balls. The team decides what order to launch their different color balls. The Supervisor will announce when there is one minute remaining, and signal the end of 4 minutes when all launches must cease.

14. The target will be surrounded by several launch lines. The chaos of multiple simultaneous launches is part of this event. Expect to see mid-air collisions, unfortunate bounces and unbelievable lucky bounces.

15. Once launched, balls cannot be retrieved and shot a second time. A team begins with 15 balls, and is allowed 15 shots. Misfires, which release a ball beyond the launch line, count as a shot. If the ball stays behind the launch line it may be re-fired. Practice shots at the tournament are not allowed.

16. The Event Supervisor will immediately intervene if:
   - A team’s device or behavior appears unsafe for any reason.
   - If any part of the device crosses the launch line.
   - If there is any interference or coaching from outside the completion area.

17. No one except contestants and judges are allowed in the competition area. Safety goggles are required for all contestants for the entire time they are in the competition area.
SCORING:

1. When the final whistle sounds the Event Supervisor will count the balls, by color contained inside the target. Any ball that is outside the target at the final whistle will have no value, even if it was in earlier and was somehow ejected.

2. The pail at the target center is worth 25 points. Inside the pool but outside the pail is worth nine (9) points.

3. A point multiplier is applied for colored balls. Orange balls count 3 times and the orange ball with a black band counts 5 times. White balls have no multiplier.

4. The final score will be equal to the sum of 50 points for submitting an appropriate Practice Log plus the numerical scores for all shots taken within the time limit.

5. The greatest number of points determines the winner.

6. Teams which impound their device after the deadline will be penalized 20 points. Devices which violate construction parameters will be scored in a tier below legal devices.

7. Devices judged to be unsafe by the Event Supervisor will not be allowed to launch, including those missing protective feet.

8. Ties will be broken in favor of the team based on these criteria, in order:
   a. Total points in the bucket
   b. Total points scored by colored balls
   c. Quality of the team Practice Log

If a question and answer concerning the rules for this event are posted in the elementary FAQ portion of our website http://macombso.org/index.php/esofaqs, the supervisors will score the event accordingly.