**LEVEL:** Middle School/High School

**NUMBER OF TEAMS:** One (1) team per school can participate at the MESA Day state competition. Three (3) teams can participate at MESA Regionals.

**TEAM MEMBERS:** Two (2) to Six (6) students

**OBJECTIVE:** To construct and build both an egg launcher and an egg receptacle, which will achieve the following objectives:

1) Launch One (1) large, fresh, raw, white chicken egg into the receptacle
2) Safely catch the egg in the receptacle without breaking it

Students will also be required to orally respond to a standard set of questions posed by judges based on the performance of their design immediately following their launch.

**MATERIALS:** Any materials that coincide with the design parameters may be used to build the launcher. Hazardous materials are not allowed.

The receptacle may not include food, soap, glass or any substance that will splatter.

The Host Center will provide the launch pad, landing pad and eggs.

**DESIGN PARAMETERS:**

1. The egg cannot be altered or covered in any way
2. Teams must design, build and operate their launcher and receptacle.
3. All parts of the receptacle must fit within the boundaries of a 50 cm x 50 cm square
4. Any launcher and/or receptacle design is allowed unless deemed unsafe by the judges. Unsafe designs could include use of compressed gas (other than air) and/or caustic materials.
5. Receptacles must be constructed so that spillage of materials used will not occur under normal circumstances (i.e. transporting or egg landing).

**TESTING CONDITIONS:**

1. At least two team members are required to be present during testing.
2. Testing will be done on grass.
3. The front edge of the receptacle must be placed a minimum of 2 meters from the launch line (see figure 1). Teams can choose to position the receptacle any distance greater than or equal to 2 m from the launch pad for each of their launches.

```
Launch Line  2.5 m  Receptacle
Figure 1
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4. No part of the launcher may cross over the launch line, either before or after launch. If any part crosses over the line during launch the team will receive a performance score of zero.
SPECIFICATION CHECK:

1. Immediately upon submission for competition, each launcher and receptacle receives a specification check to determine whether it conforms to dimensions, materials, and construction rules. Receptacles will be checked for spillage. Any launcher or receptacle which fails the specification check will be given a performance score of zero. Neither may be modified for competition during or after judging.

2. Judges may disqualify any entry if, in their opinion, the testing of the device might create a safety hazard for spectators, team members or property (i.e. sharp edges).

3. The height of the receptacle will be recorded.

4. Devices must be in testing condition prior to device inspection. If devices are disqualified during inspection check, design changes will not be allowed. Only devices passing inspection will be allowed to participate in the performance tasks.

5. Repairs are allowed, replacement parts and materials only, and all repairs must be done in the impound area under supervision of a judge. The addition or replacement of parts is NOT allowed.

6. All repair materials to be used during the competition must be impounded with the device.

7. After clearing specification check, all launchers and receptacles will be impounded until testing.

JUDGING:

1. Each device must be ready for competition when called or forfeit that trial.

2. Trial set-up is limited to two (2) minutes. When called each team will be given an egg that has been inspected by a judge. Teams can choose to position the receptacle any distance greater than or equal to 2 m from the launch pad. Teams not ready after two minutes will receive a performance score of zero.

3. The team member responsible for operation of the device will indicate to the judge that the devices are in the “ready-to-operate” position.

4. Judges will give the launch order and students may release their egg.

5. Judges will record the distance of the launch and check the egg for breakage. Breakage is defined as any crack, fracture, or chip. If breakage occurs the team will not be allowed another launch.

6. If the egg shows no breakage after the first launch, teams will be allowed up to two (2) additional launches at any distance greater than or equal to 2 m as long as no breakage occurs.

7. If no breakage occurs, the egg will be returned to the team and teams choosing to attempt additional launches will be given two (2) minutes to reposition their receptacle and ready their launcher for launch. The distance will be recorded for each successful launch and catch.

8. After the last launch, students will orally respond to a standard set of questions posed by judges based on the design and performance of their device.

SCORING:

1. Final team rankings will be based on the total score derived by adding the distances for each launch plus the Oral Debrief scores.

2. Score for each successful launch, meaning no breakage occurred, will be equal to the distance.

3. If breakage occurs, the launch distance will be divided by 10.

4. Oral Debrief score (2 point maximum)

Example Score:

- Launch 1 – 2 meters, no breakage occurs. Score = 2
- Launch 2 – 5 meters, egg is cracked. Score = 5/10 = 0.5
- Oral Debrief Score = 2 points
- Total Score = 4.5 points.
School: ________________________________

Student Names: ________________________________

For Official Use Only

Specification Check

<table>
<thead>
<tr>
<th>Specification</th>
<th>Pass</th>
<th>Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Receptacle fits within 50 cm square?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>2. Receptacle uses no illegal materials?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3. Spillage of receptacle materials will not occur under normal circumstances?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4. Receptacle is safe for competition?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>5. Launcher is safe for competition?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>6. Receptacle Height: ______________ cm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Testing

<table>
<thead>
<tr>
<th>Launch</th>
<th>Distance (m)</th>
<th>Breakage? (Y/N)</th>
<th>Score = Distance (if breakage occurred divide distance by 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Launch 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Launch 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Launch 3</td>
<td></td>
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</tbody>
</table>

Performance Score:

Oral Debrief

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrates understanding of design concepts</td>
<td></td>
</tr>
<tr>
<td>Clearly articulates ideas in an organized manner</td>
<td></td>
</tr>
<tr>
<td>Accurately assesses results</td>
<td></td>
</tr>
<tr>
<td>Comprehensive understanding demonstrated by all team members</td>
<td></td>
</tr>
<tr>
<td>Total Points</td>
<td></td>
</tr>
</tbody>
</table>

\[
\frac{\text{Total Points}}{8} = \underline{\quad}\]

Lead Judge: ________________________________

Final Score: ________________________________

(Performance + Oral)

Student Signature: ________________________________

Judge Comments: ________________________________