

Ball Sorting

DESIGN PROBLEM

The Problem:

Design a device that, when 3 balls are “poured” into it, will sort the balls and only the second of the three balls ends up in a cup (that is part of the developed device).

Limitations:

1. The three balls (two golf balls and a ping-pong ball) from the TECA kit must be used during this challenge. Each team may decide which of the three balls will be #2 in the sequence.
2. The three balls must start inside a cup.....and be “poured” into the same hole, Slot, or entrance on the device. NOTE: A judge will pour the three balls, from a cup, into the mechanism during the contest finals.
3. The final resting place of the second ball must be in a cup on the device, while the final location of the first and third balls is not important.
4. The operation of the device must be completed within 15 seconds of judge “pouring” the three balls into the device.
5. No team member may activate the device. During the operation of the mechanism no one may touch the balls, table, device, or any part of the solution.
6. The apparatus must be built from the supplies provided.
7. Only tools on the official tool list may be used to complete the contest.
8. Only tape may be used to attach the apparatus or any other part of the solution to the table top.
9. All ideas and apparatus must be produced by the group. No outside Consultations are permitted.

Divide and Conquer

DESIGN PROBLEM

The Problem:

Design and build a device in which the tripping of a standard mouse trap causes two balls and two balloons to be knocked off the device...with one ball and one balloon falling onto a table and the other ball and balloon ending up on the floor.

Limitations:

1. The entire device must start attached to a table top.
2. Two inflated balloons and two balls must be part of the device (i.e., up off the table top).
3. The balloons must not be inflated to larger than 12" in diameter, and must remain inflated throughout the event.
4. All actions of the device must start as a result of a team member manually tripping a mouse trap.
5. During the operation of the device, no one may touch the two balls, two balloons, or any other part of the mechanism.
6. One ball and one balloon must be knocked completely off (away from) the device yet remain on the table...the other ball and balloon must be knocked off onto the floor. All this must occur within 20 seconds. Timing will stop at 30 seconds, with all entries that achieve that maximum time receiving the same scoring consideration from the judges.
7. Only tools on the official tool list may be used to complete the contest. The apparatus must be built from the supplies provided.
8. All ideas and apparatus must be produced by the group. No outside consultations are permitted.
9. Only tape may be used to attach the apparatus or any other part of the solution to the table top.
10. Follow safe procedures and respect for property.

Exploding Balloon

DESIGN PROBLEM

The Problem:

Design a device that allows an inflated balloon to enter a small paper bag, then the balloon “explode” after it is entirely inside the bag.

Limitations:

1. The paper sack (bag) included in your PITSCO Problem Solving materials kit must be used during this solution.
2. A balloon must be inflated to at least 3” in diameter.
3. The balloon must travel at least four feet before it arrives “inside” the bag (specifically, it must travel at least four feet from the initial starting point to the final point where it “pops”).
- 4 The balloon must not “pop” until after it is entirely inside the bag.
 4. The apparatus must be built from the supplies provided.
 5. Only tools on the official tool list may be used to complete the contest.
 6. During the final operation of the device, no one may touch the balloon, bag, or device that causes the balloon to explode.
 7. All ideas and apparatus must be produced by the group. No outside consultations are permitted.
 8. Only tape may be used to attach the apparatus or any other part of the solution to the table top.

Ball in a Balloon

DESIGN PROBLEM

The Problem:

Design a device that will hold a ball “inside” an inflated balloon, then be able to burst the Balloon on command and permit the same ball to end up “inside” an un-inflated balloon at least 12” away from it’s starting point.

Limitations:

1. A ball from the TECA kit must be in used for this challenge.
2. The ball must start “inside” a balloon that is inflated to no more than 12” in diameter.
3. The final resting place of the golf ball must be on the device, and at least 12” from the starting point (i.e., the original location of the ball).
4. The operation of the device must be completed within 15 seconds of starting the device.
5. A team member may activate the device. During the operation of the solution, no one may touch the ball, balloons, device, or any part of the mechanism.
6. The apparatus must be built from the supplies provided.
7. Only tools on the official tool list may be used to complete the contest.
8. Only tape may be used to attach the apparatus or any other part of the solution to the table top.
9. All ideas and apparatus must be produced by the group. No outside consultations are permitted.

Multiple Ball Launcher

DESIGN PROBLEM

The Problem:

Design a device that will launch both a ping pong ball and a golf ball at least 12” vertically (into the air) at the same time.

Guidelines:

1. The two balls must never be closer than 18” to one another.
2. Energy to launch the balls must be derived from the materials provided in the supply kit or the on-site materials.
3. No human intervention is permitted other than activating the device. No contact is allowed once the device has been activated.
4. The two balls must be loaded onto the device and stationary prior to launch.
Note: The judges will measure the distance between the balls to insure the proper spacing.
5. The two balls must take off and land in a space not to exceed 5 feet by 5 feet.
6. Both balls must be in the air at least 12” above their starting position at the same time.
7. Only tape may be used to attach the apparatus or any other part of the solution to the table or bench top.
8. A total of two trials may be made during competition with the best result counting for judging.