



Engineering Day 2021

Rube Goldberg Machine Competition

Goal:

Design and build the most complicated mechanical device to achieve a simple objective: "Drop a ping pong ball into a glass beaker."

Example

This example is provided solely to give students an idea of the type of project we anticipate.---"A steel ball rolls down a channel, then trips a lever that activates another action, etc. until the final action knocks a ping pong ball into a beaker."

Rules/Judging:

1. Contestants will supply all project materials.
2. Prior to competition, create a mechanical machine (designed and assembled entirely by students) that will achieve the design challenge.
3. The machine must be self-contained and will be set up on a table provided by Crowder at the competition site. The machine must not be taller than 36 inches in height and no portion of the machine may extend beyond or below the tabletop. Machine must not be wider than 24 inches and must not be longer than 72 inches.
 - a. A 500mL beaker will be provided. Beaker dimensions are 5" height x 3 1/4" diameter.
 - b. A ping pong ball will also be provided.
4. The following items are NOT permitted: hazardous materials, explosives, caustic substances, open flames, aerosol sprays, live animals, or any materials that could be construed as unsafe to humans or potentially damaging to the contest area. Projects containing any of these items will be automatically disqualified.
5. Air filled balloons are permitted providing the balloon remains within the set boundaries of the machine including any slivers/remnants from the balloon.

6. Battery operated devices (low voltage/low current DC devices) are permitted. Only AA, AAA, C, D, 6 volt lantern and 9 volt dry cell batteries are permitted. For example, a small DC motor operated by a 9 volt battery. No electrical devices that pose a safety issue (e.g. high voltage arcs) to operators or others in the judging area will be permitted.
7. The use of microcontrollers, servos, or small DC motors is allowed.
8. The machine must not express or imply profane, indecent or lewd expressions.
9. Any loose or flying objects must remain within the set boundaries of the machine. This includes, but is not limited to, drops of water, slivers/remnants of balloon and other "small" objects.
10. The team has twenty minutes to set up, adjust and test their machine.
11. The machine must complete the task within 5 minutes. The judges will keep the official time.
12. Once the machine has been activated, students cannot touch any part of their machine until completion of the design challenge. However, if the design challenge is not completed, a second attempt may be initiated. A maximum of only one completed run will be allowed and a maximum of only one restart will be allowed. If the challenge is completed in the initial run, a second run will not be allowed. If a restart is attempted, the second run must be completed within the initial five minutes.
13. Repeated Actions: in certain cases, actions may be repeated (e.g. several balls rolling down a ramp, each ball operating a lever or gate) or action sequences may be repeated (e.g. several strings of dominoes separated by independent action items). A repeated action or repeated action sequence will only be counted the initial three times. Subsequent repeats of this action or action sequence will not be scored but will be allowed.
14. Teams must submit their Rube Goldberg Machine Entry Form at the competition site. Judges will review the actions listed and will inspect the machine dimensions and materials.
15. Teams should not disassemble the project until instructed to do so by the judges.
16. No more than five team members per machine.

Score:

Overall score will be equated as follows:

1. One point will be awarded for EACH different and distinctive action. Only actions that are different, distinctive, and visible will be scored (e.g. a ball rolling down a channel and just turning a corner would only be counted as one action). See Rule 13 (above) regarding repeated actions or repeated action sequences. Each action eligible for point consideration must be listed on a separate line on the Project Description Form. Every action must have an effect on another action and contribute to achieving the design objective; in order to be counted.

2. All machines that demonstrate a design that can, in principle, achieve the design challenge, will be scored. Projects completing the design challenge will be ranked higher than those that do not. For instance, a project that has 20 steps and completes the design challenge will be ranked higher than a project with 30 steps that doesn't complete the design objective. In the event that no projects meet the design challenge, the project with the most successful steps will be declared the winner.
3. Bonus Points: 0 to 5 extra points may be awarded for completing extra tasks and other aspects of the machine design such as:
 - Use of everyday items
 - Laugh Barometer (i.e. funny and whimsical)
 - Theme or Story
 - Artistry and Construction
 - Absurd Complexity

Rube Goldberg Machine Project Description Form

PRINT CLEARLY and LEGIBLY

School: _____

Names of Student Team Members:

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

Team Name (optional): _____

Machine Name (optional): _____

Activity Description in Order of Actions (Print or Type):

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(2) _____

(3) _____

(4) _____

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(If needed, attach additional pages, numbered per the above format)