

Mission Possible

1. Description:

Prior to the event teams will construct a Rube-Goldberg Machine which starts by dropping an unmodified American Quarter into the device and ends by having a ping pong ball exit the device. The machine should have a run time of as close to 30 seconds as possible.

A Team of Up To: 3

Impound: Yes

Maximum Time: 10 minutes

2. Construction:

- a. The device must fit within a box that is no larger than 1 m x 0.5 m x 0.5 m.
- b. Hazardous Chemicals (strong acids, strong bases, flammables, organics etc.) are not allowed.
- c. Candles and matches may be used so long as they are contained.
- d. Lead-Acid Batteries are not allowed.
- e. The only source of electrical potential allowed in your device are, AA, AAA, C, D, 9V, and 6V batteries. You may have no more than 9 V wired in series.
- f. No projectiles (except for the ping pong ball).
- g. Any sharp objects used must be contained in a safe manor.
- h. Team name and number should be clearly displayed on the device.
- i. The device may have no more than 10 energy transfers. The five forms of energy are mechanical, electrical, thermal, electromagnetic, and chemical. An energy transfer is when you change forms of energy. For example a switch being flipped causing a motor to turn on would be a transfer of mechanical (switch being flipped) to electrical (motor turns on).
- j. Teams will produce an energy transfer list for their device. This should list the starting energy form, a description of what occurs, the ending energy form, and any points earned (an example will be posted on the National Website).

3. The Competition:

- a. Prior to the competition teams may be required to fax or E-mail their energy transfer list to the event supervisor. Teams will be notified of this by the competition supervisor.
- b. Teams are required to wear safety spectacles or protective goggles during this event.
- c. Teams are required to hand in an energy transfer list to the event supervisor at time of impound.
- d. Teams may work on their machines during impound. Once impound is over they will not be permitted to touch their machines until the event coordinator instructs them to do so prior to their run.
- e. Teams will have five minutes prior to their run to finish setting up their machines.

- f. Teams will be required to designate one operator of their device. This person is responsible for dropping the quarter into the device, and performing any reach-ins into the device.
- g. No team member may have a time piece during the run.
- h. All devices must remain in impound until after the competition.
- h. The machine must be done running within 60 s of the start. Anything occurring after 60 s will not count including the task completion.

4. Scoring:

- a. Teams will earn 5 points every time the device changes forms of energy up to 10 times.
- b. Teams will lose 5 points every time they must reach-in to their machine and aid it. They also will not receive any points for the transfer that did not occur.
- c. Teams will lose 5 points for every energy transfer they have beyond 10.
- d. Teams will lose 10 points every time something other than the ping pong ball or gases leaves the device.
- e. Teams lose 20 points if their machine does not complete the task.
- f. Machines can earn bonuses for performing the following:
 - i. Launching the ping pong ball out of the machine is worth 5 additional points (the ball is airborne when it exits).
 - ii. The first time use of a pendulum is worth 5 additional points.
 - iii. Having a bell, whistle, or buzzer sound 2 transfers prior to the pong ball exiting is worth 5 additional points.
 - iv. Successfully using all five forms of energy is worth 10 extra points.
- g. Machines that violate construction requirements or are unsafe to operate will receive participation points only.
- h. Machines that do not violate construction requirements and are safe to operate will be rank according to points earned.
- i. In the event of a tie, the first tie breaker will be how close the device came to a run time of 30 seconds. The second tie breaker will be the number of bonus points earned. The third tie breaker will be number of bonuses attempted. The fourth tie breaker will be most Rube-Goldberg like.

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