EVENT 5: Greatest Acceleration Vehicle

(Dated 10/1/17)

OBJECTIVE: Construct a four-wheeled vehicle, propelled using only the energy supplied by mouse trap(s), which will transport the greatest load with the greatest average acceleration over a 1.0-m distance.

RULES:

a. The racer is to be brought to the event fully constructed requiring only minimal set up.
b. The racer must be designed and constructed entirely by the entrants from household materials and/or materials available from hardware stores and/or from art/hobby supply stores. Components such as Lego or Tetriz are allowed.
c. The only allowable source of energy to drive the vehicle is the elastic potential energy provided by the spring(s) of not more than two (2) standard mouse trap with dimensions of 5.0 cm wide x 10.0 cm in length x 0.5 cm tall. NO electrical components of any kind may be used, no remote controlled devices of any kind, and no chemical or nuclear reactions.
d. The mouse trap(s) may not be altered other than mounting requirements and synchronization if more that one trap is used.
e. No rattraps or other large animal traps allowed.
f. The mousetrap(s) must remain attached to the vehicle at all times.
g. No part of the vehicle or its operating system may be attached to the floor, wall, ceiling, or operator.
h. A 10.0 cm x 10.0 cm screen or panel must be rigidly attached to the back of the vehicle so that a motion sensor can detect the vehicle's motion.

COMPETITION AND SCORING:

a. The team will have 5 minutes to prepare their vehicle.
b. The mass of the vehicle will be recorded.
c. The vehicle will be released by pressing a wooden pencil eraser on the release mechanism of the mousetrap by a team member.
d. The team member engaging the vehicle may not impart momentum or energy to the vehicle.
e. The vehicle will be placed 0.25 m behind a starting line "0 meters".
f. A Pasco or Vernier motion sensor, supplied by the judge(s), will be used to measure the vehicle's acceleration from "0 m" to "1.0 m" .
g. It is the team's responsibility to ensure that the design of their vehicle will enable the motion sensor to measure the vehicle's acceleration. (the screen panel on the vehicle should be detectable by the sensor).
h. The better of two trials will be used as the team's score. No do-overs will be allowed.
i. The vehicle with the greatest acceleration wins.
j. In case of a tie, the vehicle with the greatest mass wins.
k. If the tie breaking procedure is used, the winning team with the greatest mass will have their acceleration increased by 10%. Their adjusted score will then become the new winning acceleration. For example, a team receiving a winning acceleration of 2.0 cm/sec^2 and also having the greatest mass will have their winning acceleration increased to 2.2 cm/sec^2.

$$\textbf{SCORE} = \frac{\text{(Your Team's acceleration)}}{\text{(Winning acceleration)}} \times 100$$

DISQUALIFICATION SCORE 20 points less than the lowest score for a qualifying vehicle in the spirit of the rules that travels forward from the starting point, and is still measurable by the motion sensor, but stops before completing the course,

Updates to the rules answers are available at: njaapt.wildapricot.org – go to the "*Forum*" section to read or post questions.
It is the team's responsibility to check for changes and clarifications to the rules.