

MOUSETRAP VEHICLE DRAFT RULES 17

1. DESCRIPTION: Teams must design, build, and test a vehicle using one, or two, snap mousetraps as its sole means of propulsion that can quickly push a plastic cup forward toward a Cup Target Point, reverse direction, and come to a stop at the Vehicle Target Point, a specified distance behind the Start Point.

A TEAM OF UP TO: 2 IMPOUND: Yes EYE PROTECTION: B APPROX. TIME: 8 min

2. EVENT PARAMETERS:

- a. All participants must properly wear eye protection at all times. Participants without proper eye protection must be immediately informed and given a chance to obtain eye protection if time allows, Participants without eye protection will not be allowed to compete.

3. CONSTRUCTION PARAMETERS:

- a. Participants will construct a vehicle where all propulsive energy must come from one, or two, 6.0cm x 12.0cm base, or smaller, unmodified snap mousetraps. An unmodified mousetrap is one that retains all of its original parts and structural integrity to function as intended. Altering the structural integrity of the mousetrap is prohibited and includes, but is not limited to, welding, bending, and cutting. Items may be added to each mousetrap through methods including, but not limited to, soldering, taping, tying, gluing, and clamping, but not for the purpose of increasing the potential energy of the unmodified mousetrap. Up to 4 holes may be drilled in each mousetrap only to attach it to the chassis.
- b. Conversion of the mechanical energy of each mousetrap's spring is permissible, but any additional sources of kinetic energy must be at their lowest states in the ready-to-run configuration.
- c. The vehicle must not be remotely controlled or tethered and must stop and reverse automatically.
- d. Electric/electronic components, devices, and tools are not permitted except for calculators.
- e. A ¼" diameter round dowel must be attached to the vehicle approximately perpendicular to the floor. The bottom of the dowel must be $\leq 1.0\text{cm}$ from the track's surface.
- f. The wheels/treads in the ready-to-run configuration must fit in a 50.0cm x 50.0 cm space of any height.
- g. Participants must start the vehicle by using any part of an unsharpened #2 pencil with an unused eraser provided by the event supervisor to actuate the trigger. The trigger must be designed so that the actuation of it is perpendicular (vertical) to the floor. The vehicle must be able to remain at the starting position without being touched until triggered.
- h. Only non-electric sighting/aiming devices are permitted. If placed on the track, they must be removed before each run. If placed on the vehicle, they may be removed at the team's discretion before each run.
- i. All parts of the vehicle must move as a whole. The only parts allowed to contact the floor during the run are wheels/treads, drive string(s) and those parts already in contact with the floor in the cup is not considered part of the vehicle at any time.
- j. Participants must be able to answer questions regarding the design, construction, and operation of the device per the Building Policy found on www.soinc.org.

4. PRACTICE LOG:

- a. Teams must record at least 10 practice runs with at least 3 parameters. The parameters must include distance, time, and any additional parameter. Logs must be impounded.

5. THE COMPETITION:

- a. The vehicle, spare parts, and logs will be impounded before the start of the competition. Tools, data, and calculating devices need not be impounded.
- b. Only participants and supervisors will be allowed in the impound and track areas. Once participants enter the event area, they must not leave or receive outside assistance, materials, or communication. Participants may not use AC outlet power during their 8 minutes.

- c. Participants have 8 minutes to set up their vehicle and complete up to 2 runs. Vehicles in the ready-to-run configuration starting before the end of the 8-minute time period will be allowed to complete a run.
 - d. Teams must place a 16 oz. plastic cup provided by the event supervisor upside down with the cup covering the Start Point. In the ready-to-run configuration, the vehicle's dowel must touch the cup.
 - e. Teams may adjust their vehicle before each run (e.g., change mousetraps, distance, directional control) either their 8 minutes providing the vehicle continues to meet specifications. The team's 8-minute time is paused when the vehicle stops to allow for the supervisor's measurements. Timing resumes once the participants pick up their vehicle or begin taking their own measurements. Teams may use their own measuring devices to verify the track dimensions during their 8 minutes.
 - f. Teams must not roll the vehicle on the floor of the event track the day of the event without tournament permission. If permitted, only participants may be present.
 - g. Substances applied to the vehicle must be approved by the event supervisor prior to use and must not damage the floor or leave residue on the track and/or event area. During their 8-minute time, participants may clean the track, but it must remain dry at all times.
 - h. Once their run starts, participants must move off of the track and not follow the vehicle until caked by ES. Run Time starts when the participants actuate the trigger. Run Time ends when the vehicle comes to a complete stop (recoils are considered part of the Run Time). If the vehicle does not move within 3 seconds after coming to a stop, the run is considered to have ended. The 3 seconds are not included in the Run Time and any action occurring after that time does not count as part of the run.
 - i. Event supervisors are encouraged to use three timers. The Run Time must be recorded in seconds to the precision of the timing device used.
 - j. Event supervisors are encouraged to use three timers. The Run Time must be recorded in seconds to the precision of the timing device used.
 - k. If the vehicle does not move upon actuation, it does not count as a run and the participants may set up for another run, but must not be given additional time.
 - l. A Failed Run occurs if a second run does not occur in the 8-minutes, or if the time or distance cannot be measured for a vehicle (e.g., it starts before the event supervisor is ready, if the participants pick it up before it is measured).
 - m. At the event supervisor's discretion, more than one track may be used. Participants will be given the choice of which track they will use. Both runs by a team must be made on the same track.
 - n. A team filing an appeal must leave their vehicle in the competition area.
 - o. The supervisor will review with the team the data and the tier recorded on their score sheet.
6. THE TRACK:
- a. All tracks will be at least 1.0m wide on a smooth, level, and hard surface. Please refer to www.soinc.org for a diagram of the track.
 - b. The event supervisor will use tape approx. 2.5cm wide and approx. 5 cm long to mark the Starting Point, Vehicle Target Point and Cup Target Point. Cup Target Point must be 3.00m away from the Starting Point. Vehicle Target Point must be 2.00m-4.00m away from the start point in the direction opposite to Cup Target Point. Exact distance in these intervals (0.50 m for Regional, 0.10 m for State, 0.01, for National) will be chosen by the event supervisor and announced after the impound period.
7. SCORING:
- a. The Lowest Final Score wins. The lower of the 2 Run Scores is the Final Score. The Final Score for any vehicle with one Failed Run must be the other Run Score.

- b. Run Score for each run = Vehicle Distance + 2 x Cup Distance + Run Time (in sec) + Penalties.
 - c. Vehicle Distance = point-to-point distance, in cm to the nearest 0.1cm, from the Vehicle Target Point to the closest part of the dowel. If the dowel covers the Vehicle Test Point, the Vehicle Distance is 0.
 - d. Cup Distance = point-to-point distance, in cm to the nearest 0.1 cm, from the Cup Target Point to the closest part of the cup. IF the cup covers the Cup Target Point, the Cup Distance is 0. If the cup tips over during a run, measurement is made from where the cup comes to rest.
 - e. Teams with incomplete practice logs must incur a penalty of 250 points. Teams without impounded practice logs must incur a Penalty of 500 points.
 - f. Each competition violation incurs 2000 Penalty points per occurrence for that run (8000 points max).
 - g. Each construction violation incurs 5000 Penalty points per occurrence for that run (15000 points max).
 - h. A vehicle not impounded during the impound period will incur 10000 pts. Penalty for each run.
 - i. Ties must be broken by this sequence (1) Lower non-used Run Score; (2) Lower Run Time of the better run; (3) Lower Distance Score of the better run.
 - j. Teams not completing any runs within the 8 minutes, or having 2 Failed Runs receive participation points.
8. SCORING EXAMPLE: The run took 20.21 seconds. The cup came to rest 42.4 cm from the Cup Target Point. The Measurement Point was 75.8 cm away from the End Target Point.

Run Score = 2 x 42.4 cm (cup dist. Score) + 75.8 cm (vehicle distance score) + 20.21 sec (time score) = 180.81 pts.