

MOUSETRAP VEHICLE B SoCal Trial

1. **DESCRIPTION:** Teams design, build, and test one vehicle using one mousetrap as its sole means of propulsion to reach a target as quickly and accurately as possible.
A TEAM OF UP TO: 2 **IMPOUND:** Yes **EYE PROTECTION:** B **EVENT TIME:** 8 minutes
2. **EVENT PARAMETERS:**
 - a. Each team must bring and impound a single vehicle, a practice log, and any additional/spare parts.
 - b. Teams may bring a stand-alone calculator of any type, data, and non-electric tools for their vehicle which do not need to be impounded.
 - c. 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 and given Participation Points only.
3. **CONSTRUCTION PARAMETERS:**
 - a. All propulsive energy must come from **one** snap mousetrap with a base 6.0 cm x 12.0 cm or smaller. No part of the jaw/hammer may extend more than 1.0 cm beyond the base. The mousetrap must retain all of its original parts and structural integrity. Altering the structural integrity of the mousetrap is prohibited, including welding, bending, and cutting. Items may be added to each mousetrap through methods including, but not limited to: soldering, taping, tying, gluing, and clamping. Added items cannot increase the potential energy of the unmodified mousetrap. Up to 4 holes may be drilled in the mousetrap to attach it to the vehicle.
 - b. Conversion of the mechanical energy of the mousetrap is permissible, but any additional sources of kinetic energy must be at their lowest energy states in the ready-to-run configuration. Pre-loaded energy storage devices may be used to operate other vehicle functions (e.g., braking system) as long as they do not provide kinetic energy to propel the vehicle.
 - c. Electric/electronic components and devices are not permitted.
 - d. An approximately ¼" round wooden dowel must be attached to the front of the vehicle approximately perpendicular to the floor. The dowel must extend at least 20.0 cm above the floor. **When the vehicle is placed flat on the track**, the dowel must extend to within 1.0 cm of the track's surface and be easily accessible by the Event Supervisor so that its front bottom edge will be the vehicle's Measurement Point for distance measurements.
 - e. In ready-to-run configuration, the entire vehicle must be no more than 0.90 m long and 0.30 m wide. After starting the run, all dimensions may change.
 - f. All parts of the vehicle must move as a whole; no anchors, tethers, tie downs, launching ramps, or other separate pieces are allowed. The only parts allowed to contact the floor during the run are wheels/treads, drive string(s), and any parts already in contact with the floor in the ready-to-run configuration. Pieces falling off during the run is a construction violation.
 - g. 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 the target distance, distance from target, and run time of at least 10 practice runs while varying at least one vehicle parameter (e.g., # of string wraps around the axle) for each run.
 - b. Logs must be impounded and will be returned when the team is called to compete.
5. **THE COMPETITION:**
 - a. Only participants and the Event Supervisors will be allowed in the impound and track areas. Once participants enter the event area to compete, they must not leave or receive outside assistance, materials, or communication.
 - b. Teams have 8 minutes of Event Time to set up and start up to 2 runs. Vehicles in the ready-to-run configuration before the end of the Event Time will be allowed to complete a run.
 - c. In the ready-to-run configuration, the vehicle's Measurement Point must be over the Start Point. The vehicle must remain at the starting position without being touched.
 - d. Teams may adjust their vehicle (e.g. change mousetraps, distance, directional control) within their Event

Time, though the Event Supervisor may re-verify that the vehicle meets specifications prior to each run. Timing is paused during any measurements made by the Event Supervisor. Timing resumes once the participants pick up their vehicle or begin making their own measurements. Teams may use their own non-electric/non-electronic measuring devices to verify the track dimensions during their Event Time.

- e. 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.
- f. Teams must not roll the vehicle on the floor of the track on 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 or leave residue on the floor, track and/or event area. Teams may clean the track during their Event Time but it must remain dry.
- h. Teams must start the vehicle using any part of an unsharpened #2 pencil with an unused eraser, supplied by the Event Supervisor, in a motion approximately perpendicular to the floor, to actuate a trigger. They may not touch the vehicle to start it, hold it while actuating the trigger, or "push" the vehicle to get it started. Once they start a run, the participants must not follow their vehicle and wait until called by the Event Supervisor to retrieve their vehicle.
- i. A Failed Run occurs for any run that does not occur in the 8 minutes, or if the time and/or distance cannot be measured for a vehicle (e.g., it starts before the Event Supervisor is ready, if it moves but does not go at least 0.50 m, the participants pick up it before it is measured, or it travels in the wrong direction).
- j. If the vehicle does not move upon actuation of the trigger, it does not count as a run and the team may set up for another run but will not receive extra time.
- k. A team filing an appeal must leave their vehicle in the competition area.

6. **THE TRACK:**

- a. The track will be on a smooth, level, and hard surface.
- b. The Event Supervisor will use approximately 5.0 cm by 2.5 cm pieces of tape to mark the Start and Target Points, with the Start and Target Point marked on each piece of tape. The timing lines will be marked with pieces of 2.5 cm wide tape at least 1.50 m long, 0.50 m and 8.50 m from the Start Point, centered on and perpendicular to an imaginary center line. The edges of the tape closest to the Start Point defines these lines.
- c. The exact Target Distance from the Start Point to the Target Point will be between 9.00 m and 12.00 m. At Regionals the interval will be 0.50 m, for State 0.25 m, and for Nationals 0.05 m. The Target Distance will be chosen by the Event Supervisor and will not be announced until the impound period is over.
- d. A photogate timing system is highly recommended. See www.soinc.org for information. If used, the system will be installed at the 0.50 m Line and the 8.50 m Line with the beams at a height of 17.0 ± 2.0 cm. At least one manual timer should be used as a backup.
- e. If no photogate system is available, 3 timers should be used along with a laser system, with the middle time recorded as the official Run Time in seconds to the precision of the timing device.
- f. At the Event Supervisor's discretion, more than one track may be used. If so, the team may choose which track they use, but must use the same track for both runs.

7. **SCORING:**

- a. The team with the lowest Final Score in the highest tier wins. Each team's Final Score is their lower Run Score with the higher tier.
- b. The Run Score for each run = 1 pt./cm x Vehicle Distance + 2 pts./s x Run Time + Penalties.
- c. The Vehicle Distance is the point-to-point distance from the Measurement Point to the Target Point in centimeters measured to the nearest 0.1 cm.
- d. The Run Time is the time it takes for the vehicle to travel between the 0.50 m and 8.50 m Lines; it starts when the vehicle's dowel reaches the 0.50 m Line and ends when it passes the 8.50 m Line. The Run Time is recorded in seconds to the precision of the timing device used. **If the vehicle passes the 0.50 m Line but stops before the 8.50 m Line, the Run Time will be recorded as 30.00 sec.**
- e. Teams with incomplete Practice Logs will incur a Penalty of 250 points. Teams without impounded Practice Logs will incur a Penalty of 500 points. Practice Log Penalties do not affect Tier placement.

- f. Tiers (from highest to lowest); **the lowest Tier will be applied when more than one is applicable:**
- i. Tier 1: Runs with no violations.
 - ii. Tier 2: Runs with any competition violations.
 - iii. Tier 3: Runs with any construction violations.
 - iv. Tier 4: Teams that did not impound their vehicle during the impound period.
 - v. Tier 5: Teams with 2 Failed Runs.
- g. Ties must be broken by this sequence: 1. Better non-scored run; 2. Faster time on the scored run. 3. Lower Vehicle Distance on the scored run.

SCORING EXAMPLE: At a competition, a team's vehicle stopped 155.3 cm from the Target Point with a Run Time of 5.79 s.

	Vehicle Distance	155.3 cm x 1 pt./cm = 155.3 pts.
	Run Time	5.79 s x 2 pts./s = 11.58 pts.
+	Penalties	0 pts. = 0 pts.
	Run Score	184.25 pts.

Recommended Resources: All reference and training resources including the **Mousetrap Vehicle DVD** are available on the Official Science Olympiad Store or Website at <http://www.soinc.org>