

WHEELED VEHICLE

1. **DESCRIPTION**: Teams design, build, and test one vehicle that uses a non-metallic, elastic material as its sole means of propulsion to reach a target as quickly, accurately, and close to their predicted time as possible.

A TEAM OF UP TO: 2 **EVENT TIME:** 10 min **EYE PROTECTION:** Z287+ **IMPOUND:** Yes

2. **SAFETY PARAMETERS**: Competitors must wear eye protection during set-up and testing of vehicle. Teams without proper eye protection must be immediately informed and given an opportunity to obtain eye protection if time allows (if not, teams are not allowed to compete).

3. **CONSTRUCTION GUIDELINES**

- a. Vehicles must be designed as a single integral device to travel exactly 10 m, come to a complete stop without straying from the centerline and be as close as possible to their predicted time.
- b. All energy used to propel the vehicle must be stored in a non-metallic elastic device. Metallic parts attached to the elastic are permitted provided they do not provide energy to the vehicle. It may be left unattached until just prior to the run. Pre-loaded energy storage devices may be used to operate other vehicle functions (e.g., braking system) as long as they do not provide energy to propel the vehicle.
- c. The distance between the center of rotation of the front-most and rear-most axles less than or equal to **65.0 cm**.
- d. The vehicle must have the point of a bent paperclip that serves as a measurement point attached to the front of the chassis that extends down to within 1 cm of the track's surface. The point of the paperclip nearest the track surface is used as the reference point for distance measurements.
- e. The entire vehicle width is less than or equal to 30.0 cm at all points. There is no restriction on the height of the vehicle.
- f. Competitors must start the vehicle by actuating a trigger using an unsharpened #2 pencil with an unused eraser (supplied by the Event Supervisor). The trigger must be designed so that its actuation is perpendicular to the floor (vertical). Any trigger that is not vertical is a construction violation.
- g. The wheels and drive strings (if any) are the only vehicle parts permitted to make contact with the floor at any time.
- h. Stopping mechanisms must work automatically. The vehicle must not be tethered or remotely controlled. No electrical components can be used on the vehicle or its alignment devices.

4. **THE TRACK**

- a. The competition track will be a Gym floor.
- b. On the day of the competition, a track will be laid out using masking tape. The track will have a centerline, starting line, and target line 10 m from the starting line.

5. **THE COMPETITION**

- a. All vehicles will be impounded at the beginning of the day.
- b. All parts of the vehicle must move as a whole; no anchors, tie downs, launching ramps, or other separate pieces are allowed. The competitors must not hold, constrain, or push the vehicle. If any piece falls off during the run, it is considered a construction violation. The vehicle must be able to remain at the starting position without being touched until triggered.

- c. Teams have 10 minutes to set up, make any adjustments, take measurements, and complete two runs.
- d. Sighting and/or aiming devices placed on the track are permitted but must be removed before the vehicle runs. Aligning and sighting devices mounted on the vehicle may be removed at the team's discretion prior to each run.
- e. Run Time starts when the vehicle begins forward motion and ends when the vehicle comes to a complete stop. If the vehicle does not move upon actuation of the switch, it does not count as a run, but the team does not receive any extra time to complete its two runs.
- f. If the vehicle moves any distance after actuation of the switch, it must be considered a run.
- g. Event supervisors will use at least two (2) independent timers on all runs. Final Run Times will be an average of all judges.

6. SCORING: Low score wins

- a. The Run Score = Distance Score + Time Score + Centerline Bonus.
- b. The Distance Score is the distance from the measurement point on the vehicle to the Target Line (in mm).
- c. The Time Score = $10 \times (\text{Run Time})$
- d. A Centerline Bonus of -20 pts is awarded if the center tape (1" masking tape) remains completely within the vehicle's track (between the wheels) during the whole run.

SCORING EXAMPLE: At a competition, a team's vehicle stops 103 mm from the Target Line. It made the run in 7.86 seconds, kept the Centerline within the vehicle's track.

Distance Score = 103

Time Score = $(10 \times 7.86 \text{ sec}) = 78.6$

Centerline Bonus = -20

Run Score = $103 + 78.6 + -20 = 161.6$