



Middle School CO2 Car Race / Design

Event Coordinator:

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Level of Competition: High School

Description of the competition:

Students design, build and race wooden or 3-d printed cars powered by released CO2 gas. The vehicles will be designed and built using the following rules (mostly derived from the Technology Student Association Dragster Design Challenge). Honors will be awarded to the top vehicles based on two categories; speed, engineering design.

Vehicles that fail to meet the specifications will be disqualified.

Rules of competition:

1. One individually produced dragster per student.

All CO2 cars must follow the same rules; each school can bring a total of **10 Cars Per Division** (5) cars will be raced and judged on **Speed**

(5) cars **will not be raced**, but entered into judging for **Design** only

Cars must be entered into **ONLY ONE** Category: **Speed** or **Design**. NO 3-d printed cars in this Class

Design Class.

2. Design cars may have added pieces, and fit into a box 80mm wide including wheels, 100mm height, 310mm long

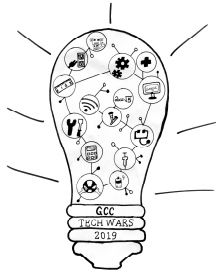
3. **No max weight for design cars.**

4. Students can utilize any tools or machines to build their vehicle.

5. All cars must have a finish coat (dry prior to registration).

6. Students will not be allowed to tune or make repairs after registration.

7. Standard 8gm Pitsco CO2 cartridges will be supplied at race time



Material Requirements:

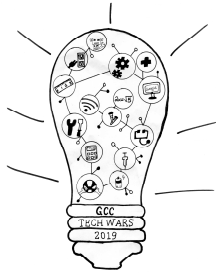
1. One piece all wood or 3-d printed solid construction. No add-ons or wood glued together.
2. Paint and decals can be used as long as they are not considered body strengthens.
3. A vehicle must have 4 wheels, each of which must meet front and rear wheel regulations/dimensions.
4. All wheels must be made entirely from plastic.
5. A maximum of 8 spacer washers may be used.
6. A maximum of 8 axle clips may be used.
7. Axles and bushing can be of any material.
8. Lubricants can be used as long as remnants are not left on track or people.
9. All wheels must roll.

Specific Tolerances:

	Max	Min
Dragster Mass (all components except CO2 cartridge)*	170 g	65 g
Dragster Body (length)	305mm	200mm
Dragster body (height at rear with wheels)	75mm	56mm
Dragster body (width at axles - front and back)*	42mm	35mm
Dragster body (width including wheels)	80mm	---
Dragster body rail style car (cross section diameter)*	---	5mm
Power plant (depth of hole)	52mm	50mm
Power plant (housing thickness around entire housing)*	---	3mm
Power plant (housing diameter)	20mm	19mm
Power plant center line (from body bottom)	35mm	31mm
Axles (diameter)	3mm	3mm
Axles (length)	70mm	42mm
Axle bearing (diameter)	4.5mm	3.5mm
Axle hole (diameter)	4.5mm	3.5mm
Axle hole (position above body bottom)	10mm	5mm
Axle hole (position from either end of body)	100mm	9mm
Wheelbase	270mm	105mm
Spacer bearing (diameter)	9mm	7mm
Wheels, front (diameter)	37mm	32mm
Wheels, front (width of greatest diameter)	5mm	2mm
Wheels, rear (diameter)	40mm	30mm
Wheels, rear (width of greatest diameter)	18mm	15mm

"*" Specifications that often lead to a vehicle being disqualified

Track Note:



The exact length of track will be determined by space available. Unlike the TSA rules, a guideline is not used to secure dragster to the track. The lane is 6 inches wide with a 1-inch tall wall on each side. There may be bumps where sections fit together.

An Impulse race system, which uses a student's reaction time to launch their vehicle, will be connected directly to the finish gate. If a race time is not recorded, event coordinators will determine if the car should race again. If the cars design is a factor, it will not race again. (Example: light mass of vehicle causes it to fly off track.)