



2020 State Contest

CO2 DRAGSTER

Contest Description

This is an open contest to all SkillsUSA members, regardless of regional results. This contest is now a secondary (7–12th grade), and a post secondary contest. Each contestant is limited to one entry in the race category. The SkillsUSA California CO2 Dragster Competition is designed to promote enthusiasm and motivation through hands-on experiences and competition. Key concepts of design, woodworking skills, measuring skills, and accurate record keeping are combined to advance the goals of SkillsUSA

Contest Guidelines

Each drag race vehicle must pass inspection. Failure to meet any one of the specifications will eliminate the car from the contest.

The competition will consist of five major components, plus a Bonus Elimination.

1. Standard Performance Criteria
2. Time Trial Results
3. Design & Construction Assessment
4. Portfolio Assessment.
5. Drawing Assessment.

Standard Performance Criteria (30%)

The standard performance data for the dragster will be determined from a series of performance tests. Standard performance will be worth 30 % of the Skills Quotient. There will be 300 points possible in the standard performance category. Scoring will be determined through the Standard Performance Criteria Rubric as shown.

1. Rolling friction – Rolling friction will be calculated by rolling the dragster down a test ramp and measuring the distance traveled from the center of the front of the ramp to the farthest point traveled by the dragster. See figure below.

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2. Alignment – The alignment of the dragster will be measured by rolling the dragster down a test ramp and measuring the distance perpendicular from a line extending from the centerline of the test ramp at 3 feet from the base of the test ramp. See figure below.
3. Aerodynamic Drag – The aerodynamic drag will be determined by measuring the frontal drag in a wind tunnel.

Time Trials Results (40%)

Time trial results will be 40% of the total preliminary scoring. There will be 400 points possible for the time trials.

1. Dragsters will complete two at a time but will race only against time.
2. Dragsters will run on mono-filament line down a 65-foot track.
3. Timing will begin when the firing mechanism is fired. Both dragsters will start simultaneously
4. Timing will end when the dragster passes through the electronic beam at the finish line. Times will be recorded to the nearest 1/000 of a second
5. All dragsters will have two trials.
6. The average of these two trials will be calculated and then divided into the fastest average time trial of all competitors.
7. The result of this division will be multiplied by 40 and rounded to the nearest whole number to determine the amount of points awarded for the time trial results.

Example: A dragster had two time trials of 1.220 and 1.320. The average of these would be 1.270. If the fastest dragster in the time trials had an average time of 1.115, then the points scored would be 1.115 divided by 1.270 and the result multiplied by 200, or 175.59. Rounded to the nearest whole number, the scored awarded would be 176 points. ie.... $(1.115 / 1.270) \times 200 = 176$

Design & Construction Assessment (15%)

Design & Construction Assessment will be 15% of the Skills Quotient. There will be 150 points possible for design & construction. Dragsters will be assessed by a scoring rubric

- Aesthetics – The appearance of the shape, uniqueness, graphic additions, colors, etc. as a whole are pleasing

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- Durability – The overall construction of the dragster is a solid as evidenced by performance in the four time trials.
- Finish – The finish of the dragster is smooth, consistent, and lustrous.

Drawing Assessment (15%)

The drawing assessment will be 15% of the criteria, and will be worth 150 points. The drawing will be assessed using the rubric below.

Excellent	= 50 points
Above Average	= 40 points
Average	= 30 points
Below Average	= 20 points
Poor	= 10 points

Neatness- The overall appearance of the drawing is pleasing. The use of mechanical drawing tools is evident.

Scale - The drawing is to scale and labeled as such. The spacing of borders and views are appropriate. The dimensions are accurate.

Completeness - The drawing has a border and title block. The drawing has a top view and side view along with dimensions.

Bonus Elimination Competition

1. An additional Bonus Elimination Competition will provide the opportunity for head to head racing to help determine the champion. The students with the best 16 scores will compete in the Bonus Elimination Competition.
2. Dragsters will be seeded in standard tournament order, with the best score having the #1 seed, and the 16th score having the #16 seed.
3. The Bonus Elimination Competition will be a single elimination with dragsters running in head to head competition. Each round of competition that a dragster runs in will add a 10-point bonus on the Skills Quotient Sheet. If the dragster competes in the final round to determine the winner, 40 points is added to the final score.
4. The winner of the Bonus Elimination Competition would receive 50 bonus points in addition to those earned in each round to be added to the final score.

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SkillsUSA California Dragster Specifications

Judges Note: Most cars have difficulty passing inspection and are therefore disqualified. Failure to meet any one of the criteria listed below will result in a car being eliminated from the contest.

- 1) The dragster must have a weight of 2.5 oz or more (without CO₂ cartridge)
- 2) Weight may be added to the body so long as it is not deemed unsafe. Doing so will lead to fewer points awarded in the design and construction evaluation criteria.
- 3) The completed dragsters maximum overall length will be no greater than 12.000 inches. Its minimum length will be no less than 8 inches.
- 4) The completed dragsters maximum overall width will be 3.75 inches. Its minimum width will not be less than 2.500 inches.
- 5) The dragster must have a cartridge hole depth of 2.000 inches.
- 6) The dragster must have a cartridge hole diameter of .750 inches.
- 7) The cartridge hole may be relatively loose or tight due to the nature of wood.
- 8) The height of the cartridge hole (measured from the track surface to the center of the hole) must be 1.300 inches minimum, 1.700 inches maximum.
- 9) The dragster must have a minimum of .125 inches of wood around the cartridge hole. Nothing but the back of the cartridge hole should be exposed.
- 10) The dragster must have two screw eyes, each located on the centerline of the dragster, with a minimum of 4.000 inches between the screw eyes.
- 11) The dragsters body must be one continuous piece of solid or laminated wood of sufficient strength to withstand racing.
- 12) Bearings, bushings, and lubricants may be used in the construction.
- 13) The dragster must have at least three wheels.
- 14) The wheel's maximum diameter will be 2.000 inches; minimum diameter will not be less than 1.000 inch.
- 15) The wheel's maximum width will be .800 inches. The minimum width of the wheels will not be less than .062 inches.
- 16) Wheels must be made of plastic or rubber.
- 17) Nothing but the wheels may touch the track surface. The body and eyelets should be clear of the track and must pass over a dime when laid flat.
- 18) Any dragster deemed unsafe in the opinion of the judge(s) will be disqualified.

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19) Dragster, Resume and working drawings are required at check-in time.

*These specifications are crucial to maintain safety and compatibility with race hardware.

Materials Supplied by SkillsUSA CA

- a. C02 Track
- b. Wind Tunnel (if available)
- c. C02 Cartridges
- d. All necessary information and furnishings for judges and technical committee

Student Materials List

- a. C02 Dragster
- b. C02 Drawing
- c. Resume

Clothing Requirements

Class E - Casual Attire

Official Attire for Men:

- Official SkillsUSA white polo shirt
- Black dress slacks (accompanied by black dress socks)
- Black dress shoes

Official Attire for Women:

- Official SkillsUSA white polo shirt
- Black dress skirt (knee-length) or black dress slacks
- Black or skin-tone seamless hose
- Black shoes

[Clothing Classifications](#)

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