

# Youth Engineering Contest

## DRAGSTER DESIGN

FAST TRACK TO SUCCESS!

# DUNCAN

AREA ECONOMIC DEVELOPMENT FOUNDATION

### OVERVIEW

Participants design, produce working drawings, and build a CO<sub>2</sub> powered dragster to race. Dragster kits are \$5 – to purchase and pick up contact Henry at 580-574-8787 or [Henry@ok-duncan.com](mailto:Henry@ok-duncan.com).

### PURPOSE

Design and create a fast CO<sub>2</sub> powered dragster according to stated specifications and using only certain materials. **Parents may assist with the car, but parents cannot make the car for the student.**

### ELIGIBILITY

Entries are limited to 7th-12th graders within the Red River Technology Center district.

### SCHEDULE

- A. There will be two divisions: High School (9<sup>th</sup> – 12<sup>th</sup> grades) and Middle School (7<sup>th</sup> – 8<sup>th</sup> grades). High School and Middle School divisions will not compete against each other, but they will compete on the same day.
- B. **Each dragster and drawing should be submitted for judging at the Duncan Area Economic Development Foundation (DAEDF) offices, 941 W Peach, Duncan, between 2:00 p.m. and 6:00 p.m. on or before **Wednesday, October 16, 2024**. Please place the drawing & car in the red box. Write the student's name and school on the outside end of the box.**
- C. Teachers will be notified the day after judging if one of their cars does not meet specifications. The student or teacher will be allowed to pick up the car from DAEDF and make the necessary adjustments. The car must be returned by 6:00 p.m. the next **Monday, October 28, 2024**.
- D. The race will take place at the **Simmons Center located at 800 Chisholm Trail Parkway, Duncan, **Tuesday, November 5, 2024****. Middle school should arrive between 8:00 a.m. and 8:30 a.m. with racing and awards between 8:45 a.m. and 11:30 a.m. High school should arrive between 11:00 a.m. and 11:30 a.m. with racing and awards between 11:45 a.m. and 2:30 p.m. These are estimated times and dependent upon number of entries.
- E. Cars must be picked up at the conclusion of the event. Cars not picked up by the end of the day will become the property of DAEDF.

### PROCEDURE

- A. Participants or Teachers check in their entries at the time and place stated.
- B. Entries are reviewed by evaluators to determine, among other things, safety on the track.
- C. Safe dragsters race for qualifying time on the raceway.
- D. The cars compete in the fastest time format to earn points for the race portion of the event.

## REGULATIONS

- A. Each entry will be assigned an entry number upon registration. **Please put only the entry number on the drawing and car large enough to be legible by the race officials, preferably on the top of the car over the CO<sub>2</sub> cartridge area. Please do not place your name or school name anywhere on the car or drawing. Each entry must be presented for judging in the dragster red box with the drawing inside and their number and school name written on the outside end of the box. Only one entry will be allowed per student.**
- B. Each entry must be submitted with a full-size metric drawing of the completed vehicle. A two (2)-view (top and side) drawing with metric dimensions is made on paper no larger than B-size drawing paper. Drawings are developed using standard engineering practices and procedures. The drawing may be produced using traditional drafting methods and CAD. The title block of the drawing includes only the participants "entry number" that is assigned at registration time and is placed on the entry and drawing. The car must be in a completed state including wheels to be judged. Please do not put the student's name or school on the drawing.
- C. The official distance between the start line and finish line on the race track is twenty (20) meters.
- D. No repair or maintenance is allowed after the judges have completed their final scores. Any entry damaged during the race is evaluated by the event coordinator to determine whether or not the vehicle is allowed to race again. In the event the vehicle is damaged by the contest personnel, the event coordinator rules as to whether the vehicle may be repaired by the student entering the vehicle. This is the only reason a student is allowed to touch his/her vehicle after registration. Undamaged wheels that come off during the event may be replaced as determined by the event coordinator. Damaged wheels may not be replaced.
- E. **Dragsters that do not meet the following specifications/tolerances are disqualified from the race. Both middle school and high school students will use the high school dimensions listed on the Go-No Go gauges/rulers, not the middle school dimensions. Dimensions are as stated in these rules.**

### DRAGSTER BODY

**DB1.** One-piece, all-wood construction. Any type of lamination results in disqualifications. No add-ons such as body strengtheners, fenders, plastic canopy, exhausts, or air foils may be attached to or enclosed within the vehicle. Fiberglass and shrink wrap are considered body strengtheners and cannot be used on the car body for any reason. Decals may be used for decoration only; i.e., decals cannot cover the exterior axle holes or be used to cover open areas of the body. Decals may not cover more than ¼ of the car body's surface. Hydro-film dipping is a type of full-body decal and is not allowed. Two (2) or more like or unlike pieces of wood glued together are not considered one-piece, all-wood construction.

		<b>MINIMUM</b>	<b>MAXIMUM</b>
<b>DB2</b>	Body Length	200mm	305mm
<b>DB3</b>	Body Height with wheels		75mm
<b>DB4</b>	Body Mass (complete car with wheels, without CO <sub>2</sub> cartridge)	40g	
<b>DB5</b>	Body width at axles, front & back	15mm	42mm
<b>DB6</b>	Complete Car Width (including wheels)		90mm

### AXLES/AXLE HOLES/WHEELBASE

		<b>MINIMUM</b>	<b>MAXIMUM</b>
<b>A1</b>	Dragsters must have 2 axles per car		
<b>A2</b>	Bottom of axle bearing above bottom	5mm	10mm
<b>A3</b>	Wheelbase (axle distance apart )	105mm	270mm
<b>A4</b>	Bearings, bushings, and lubrication		

	ARE allowed in this race.		
<b>A5</b>	Glue may be used		

### **SPACER WASHERS/CLIPS**

		<b>MINIMUM</b>	<b>MAXIMUM</b>
<b>S1</b>	Spacer washers		8
<b>S2</b>	Axle clips		8

**S3.** Silicone or any other type of glue/adhesive may not be used in place of wheel clips to hold wheels or axles in place.

### **POWER PLANT (CO<sub>2</sub> CARTRIDGE HOLE)**

**P1.** The power plant hole must be at the farthest point at the rear of the car and must be drilled parallel to the racing surface to assure proper puncture of the CO<sub>2</sub> cartridge. **A minimum of 3mm thickness around the entire power plant hole must be maintained on the dragster safety.** The inside of the power plant hole must not be painted.

		<b>MINIMUM</b>	<b>MAXIMUM</b>
<b>P2</b>	Hole depth	48mm	54mm
<b>P3</b>	Safety Zone Thickness (no exposed cartridges)	3mm	
<b>P4</b>	Chamber Diameter	19mm	20mm
<b>P5</b>	Lowest point of chamber diameter to race surface (with wheels)	26mm	40mm

### **EYE SCREWS**

**ES1.** Dragsters must have two (2) screw eyes per car that meet tolerances, no more. Screw eyes must not make contact with the racing surface. The track string must pass through both screw eyelets, which are located on the center line of the bottom of the car. Glue may be used to reinforce the screw eyes. It is the responsibility of the car designer/engineer to see that the eye screw holes are tightly closed to prevent the track string from slipping out. As with all adjustments, this must be done prior to event check in.

		<b>MINIMUM</b>	<b>MAXIMUM</b>
<b>ES2</b>	Inside Diameter	3mm	5mm
<b>ES3</b>	Distance apart (at furthest point)	150mm	270mm

### **WHEELS**

**W1.** A dragster must have four (4) wheels, no more. All four (4) wheels must touch the racing surface at the same time. All wheels must roll. Wheels must be made entirely from plastic. Dimensions must be consistent for the full circumference of the wheel.

		<b>MINIMUM</b>	<b>MAXIMUM</b>
<b>W2</b>	Front & Rear wheel diameter	30mm	40mm
<b>W3</b>	Front & Rear wheel width (at surface contact point)	1.5mm	18mm

### **EVALUATION**

Evaluation is based on points earned through car design and appearance, accuracy, and quality of the drawing, as well as points earned through placement in the race. ***In addition, a People's Choice contest will take place with those in attendance voting on the car with the best design and appearance.***