

# Youth Engineering Contest

## DRAGSTER DESIGN

FAST TRACK TO SUCCESS!

**DUNCAN**  
AREA ECONOMIC DEVELOPMENT FOUNDATION



**HALLIBURTON**



### 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 Jeannie at 580-255-9675 or [Jeannie@ok-duncan.com](mailto:Jeannie@ok-duncan.com).

### PURPOSE

Design and create a fast CO<sub>2</sub> powered dragster according to stated specifications and using only certain materials.

### ELIGIBILITY

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



### HIGH SCHOOL TIME LIMITS

- A. Entries must be started after May 31, 2015, and completed by March 22, 2016, for **9-12<sup>th</sup> grades**.
- B. Each dragster and drawing should be submitted for judging at the Red River Technology Center, Health Careers Building, located at 3300 West Bois D'arc, Duncan, between **2:00 p.m. and 6:00 p.m. on Tuesday, March 22, 2016**. 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 do not meet specifications and the infraction is easily remedied. The student or teacher will be allowed to pick up the car from Duncan Area Economic Development Foundation (DAEDF), 7576 N Highway 81, and make the necessary adjustments. The car must be returned by 6:00 p.m. the next Monday. Race brackets will be finalized Tuesday and the track will be set up Wednesday for the **Thursday, March 31, 2016, Race**.
- D. On Race Day, **Students/Teachers will arrive and check-in at the Duncan High School gym located at 515 North 19<sup>th</sup> Street, Duncan, Thursday, March 31, 2016, between 8:30 a.m. and 9:00 a.m.**
- E. The dragsters will race between 9:00 a.m. and 1:30 p.m. on Thursday, March 31, 2016.
- F. 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.

### MIDDLE SCHOOL TIME LIMITS

- A. Entries must be started after May 31, 2015, and completed by April 26, 2016, for **7-8<sup>th</sup> grades**.
- B. Each dragster and drawing should be submitted for judging at the Red River Technology Center, Health Careers Building, located at 3300 West Bois D'arc, Duncan, between

**2:00 p.m. and 6:00 p.m. on Tuesday, April 26, 2016. 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 do not meet specifications and the infraction is easily remedied. The student or teacher will be allowed to pick up the car from DAEDF (7576 N Highway 81) and make the necessary adjustments. The car must be returned by 6:00 p.m., Tuesday, May 3rd. Race brackets will be finalized Wednesday and the track will be set up Thursday for the **Friday, May 6, 2016, Race.**
- D. On Race Day, **Students/Teachers will arrive and check-in at the Marlow School gym located at 201 South 9<sup>th</sup> Street, Marlow, Friday, May 6, 2016, between 8:30 a.m. and 9:00 a.m.**
- E. The dragsters will race between 9:00 a.m. and 1:30 p.m. on Friday, May 6, 2016.
- F. 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 Duncan Area Economic Development Foundation.

### 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.**
- 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. A **free CAD software is available at <http://www.3ds.com/products/draftsight/download-draftsight/>.** 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 during check-in. Please do not put the student's name or school on the drawing. If you must identify them, use a pencil to number them for your benefit; please print small.
- 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 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 conference 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. Two (2) or more like or unlike pieces of wood glued together are not considered one-piece, all-wood construction.

		MINIMUM	MAXIMUM
<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 CO2 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

		MINIMUM	MAXIMUM
<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

		MINIMUM	MAXIMUM
<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.

		MINIMUM	MAXIMUM
<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 double elimination on-site 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.***