

Research & Design CO2 Race Car

Car Description/Color _____ Name _____ Pd _____

The purpose of the research and design competition is to demonstrate your ability to design, draw, and build a quality product (CO2 powered car), within a set of rigid specifications (metric/mm). You will need a shoe box and spray paint to complete this project. All other materials: wood body, wheels, axles, spacers, eye hooks, CO2 cartridges, and race track will be provided by Mr. Farrara. Refer to the step by step procedure construction sheet for more details.

1. **Thumbnails** Draw at least 20 different designs (10 side and 10 top)
2. **Rough Sketch** Sketch and shade in your favorite design (side & top) in half scale.
3. **Final Drawing** Draw and color your favorite design full scale on the metric graph paper (side and top views) following the specific tolerances listed below.
Trace and cut out side and top patterns.
4. **Prototype** Make a 3-dimensional (3D) prototype of your car design on styrofoam.
Make any modifications to your design at this time.
5. **Production** Produce your final car design in finished form out of balsa (light) or bass (heavy) wood.

Specific Tolerances:	Minimum	Your Car	Maximum
a. Axle lengths (front and back)	20mm	f _____ b _____	70mm
b. Bottom of axle hole to the bottom of the car (front & back) *	05mm	f _____ b _____	10mm
c. Axle hole from the rear of the car	09mm	_____	100mm
d. Car body length	200mm	_____	305mm
e. Car body width at the front axle hole *	10mm	_____	42mm
f. Car body width at the rear axle hole *	20mm	_____	42mm
g. Car width including wheels (f or b)	42mm	_____	90mm
h. Power plant (CO2) hole depth (hole diameter is 20mm)	50mm	_____	52mm
i. Power plant safety zone thickness (thinnest part) *	03mm	_____	26mm
j. Power plant location (center of the hole to the bottom of the car)	31mm	_____	35mm
k. Screw eyes spacing	155mm	_____	270mm
l. Wheelbase (axle hole to axle hole)	105mm	_____	270mm
m. Car body mass, painted, and ready to race	45 g	_____	170g

* Use a digital or analog metric caliper to measure (answer should include decimals)

Car Grade _____/200 pts. Grade **R & D** (5 pts each) _____ **75 pts.**