

CO2 Dragster Final Assignment

Name: _____ Hour _____

Technology Literacy
Standard 1 2 3 4

The Design Process:

Please answer these questions with complete sentences

1. What are **Thumbnail Sketches**? _____

2. How did you come with your **Final drawing**? _____

3. How did you drill **Axle holes**? _____

4. Explain the **Cutting** process. _____

5. What tools did you use in the **Shaping** process? _____

6. Explain the **Painting** process. _____

7. What **Wheels** did you decide on, and why? _____

8. How did put the **Screw Eyes** on your car. _____

9. What is the purpose of the **screw eye**? _____

10. What is **Co2**? _____

11. Why is **CO2** used in the propulsion of your car? _____

12. What kind of CO2 Car did you build? **Rail ~ Shell ~ Show ~ Normal** (Circle) *explain:* _____

13. **Testing** - Weigh your CO2 car on the scale. _____ Grams

Co2 Dragster Math
Calculate the speed of your dragsters using this formula:

$$\text{Average speed} = \frac{\text{Distance}}{\text{Time}} \qquad S = D/T$$

Trial 1 _____	Trial 2 _____	Average Time _____	Speed _____
------------------	------------------	-----------------------	----------------

Notes:

Thumbnail Sketches

Thumbnail sketches are little. Be Creative. Don't be afraid to experiment with some strange designs. They do not have to have much detail. They are quick sketches that give you simple ideas (brainstorm)

Final Drawing

Decide which of the two sets of rough drawings you like best. Show it to other students in your class. Discuss your idea with them. Draw your design accurately on your Research and Design sheet supplied by your teacher. These drawings must not be rushed.

Wheels

A dragster must have exactly four (4) wheels. All four (4) wheels must touch the racing surface at the same time. All wheels must roll. Wheels must be made entirely from plastic.

Eye screws

Dragsters must have no more than two (2) eye screws per car that meet tolerances. Eye screws must not make contact with the racing surface. The track string must pass through both eye screws, which are located on the center line of the bottom of the car. Glue may be used to reinforce the eye screws. 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.

Power plant (CO2 cartridge hole)

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 CO2 cartridge. A minimum of 3mm thickness around the entire power plant hole must be maintained on the dragster for safety. There should be no paint inside the CO2 cartridge hole.

What is a CO2 Dragster?

- CO2 dragster cars are model dragsters cars. They are designed for speed and use CO2 cartridges for power

The Dragster Body

- Basswood Body Blank
- 12 in long
- CO2 hole

The CO2 Cartridge

Carbon + Oxygen = Carbon Dioxide

Engineering Principles

- Newton's Laws of Motion
- Aerodynamics
- Mass

- Drag
- Friction

2nd Law of Motion $F=ma$

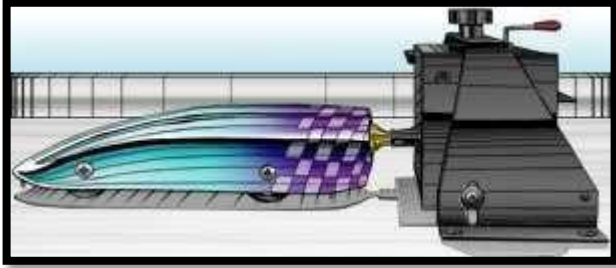
F = force

m = mass

a = acceleration

Acceleration is dependent upon the mass and force of the car.

- For a fast car, you need:
- Big force
- Light car



Newton's 3rd Law of Motion

- The driving principle behind these cars "For every action, there is an equal and opposite reaction."



The #1 most important factor in the speed of you dragster car is...

Mass

Cars with less mass go much faster!



Friction

- The 2nd Most Important Factor!
- Thanks to our friend gravity, everything has friction.

On a CO2 car, friction occurs primarily in three places:

- Between the wheels and the ground,
- Between the axles and the car body,
- Between the eye-hook and the fish line track

Reducing Friction

- Make sure the axle & tires are free to rotate.

- Make sure the wheels are not rubbing on the car body.
- Be sure to install your eye-hooks properly.
Poorly aligned eye-hooks are often the cause of a slow car.

Aerodynamics

- The 3rd Most Important Factor!
- What is aerodynamics?
- The word comes from two Greek words: *aerios*, concerning the air, and *dynamis*, which means force.
- **Aerodynamics is the study of forces and the resulting motion of objects through the air**

Drag

- Drag is the resistance of wind moving over an object.



Drag

The Balancing Act:

Advantages:

Aerodynamically shaped cars have less drag so they go faster.

Disadvantages:

Aerodynamically "clean" cars are more difficult to build.

Types of CO2 Cars



PowerPoint Assignment: (50 pts)

Your assignment is to create a PowerPoint with the following information.

Slide 1 ~ Title - 8th Grade CO2 Car Project with your picture with CO2 car

Slide 2 ~ Explain the Design Process

Slide 3 ~ Preparing to build car, how did you get final design to block of wood

Slide 4 ~ Safety Glasses

Slide 5 ~ Drilling axle holes, what size of drill bit and drill used

Slide 6 ~ The cutting process, what tool used

Slide 7 ~ Shaping, what tools and sand paper used

Slide 8 ~ Painting procedure

Slide 9 ~ Installing Hardware, axle, eye screw, wheels, straw,

Slide 10 ~ Racing, explain the track

Slide 12 ~ Calculation Speed

Slide 13 ~ All sources used. Especially any images used