CO2 Dragster
Final Assignment
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 your 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
The Balancing Act:

**Advantages:**
Aerodynamically shaped cars have less drag so they go faster.

**Disadvantages:**
Aerodynamically "clean" cars are more difficult to build.

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Types of CO2 Cars

- Rail Car
- Shell Car
- Show Car
- Normal Car

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PowerPoint Assignment:

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

**Slide 1** ~ Title – “8th Grade CO2 Car Project” with a picture of you and your partner 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 11** ~ Calculation Speed

**Slide 12** ~ All sources used. Especially any images used