

Building A "Race Car"

Learning To Use A C.A.D. Program & A 3d Printer

Syllabus - (345 pts.)

Project Description

"Race Cars" Team Competition

Student teams will design and build a race and compete against the other class teams. There are two titles the teams will be competing for:

Competition #1. Fastest Race Car.

Competition #2. Coolest Car...The Nicest Design.

Tinkercad Training (25 pts.)

1. Students will be shown the instructor's original "Race Car" Models in Tinkercad.
 2. The Instructor will explain/show the students what Computer Aided Design (CAD) is.
 3. Students will create a Tinkercad account at: <https://www.tinkercad.com>
 - a. The instructor will provide the students with a class Invite Code (Provided to the instructor on their Teach Tab).
 4. Students will begin to learn how to use Tinkercad by completing a series of tutorials with a partner. Students will show their partners that they completed a tutorial and the partner will initial their partner's grade sheet that they saw it. Here are the online tutorials that will be followed:
 - Learning Moves
 - Camera Controls
 - Creating Holes
 - Scale, Copy & Paste
 - Key Ring Letters!
 - Die on the Workplane
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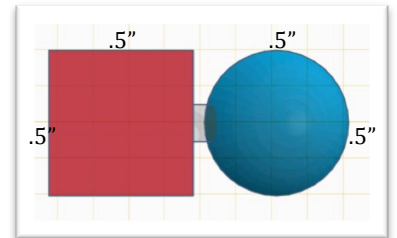


Developing Your New Skills – "eg, Cube & Sphere" (40 pts.)

Students will develop their CAD skills by successfully attaching a Cube to a Sphere with a peg. The peg sits in a hole that was formed in both shapes. This skill is the basis for the car that the students will soon create.

- Create a Cube: H: .5" x W: .5 x L: .5"
- Create a Sphere: H: .5" x W: .5 x L: .5"
- Create a peg that can slide in one side of each of these geometric shapes, but not out the opposite side. The two shapes should be able to touch when the peg is inside of them.

Note: Please ask the instructor to actually hold the model!

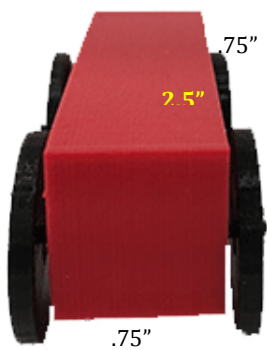
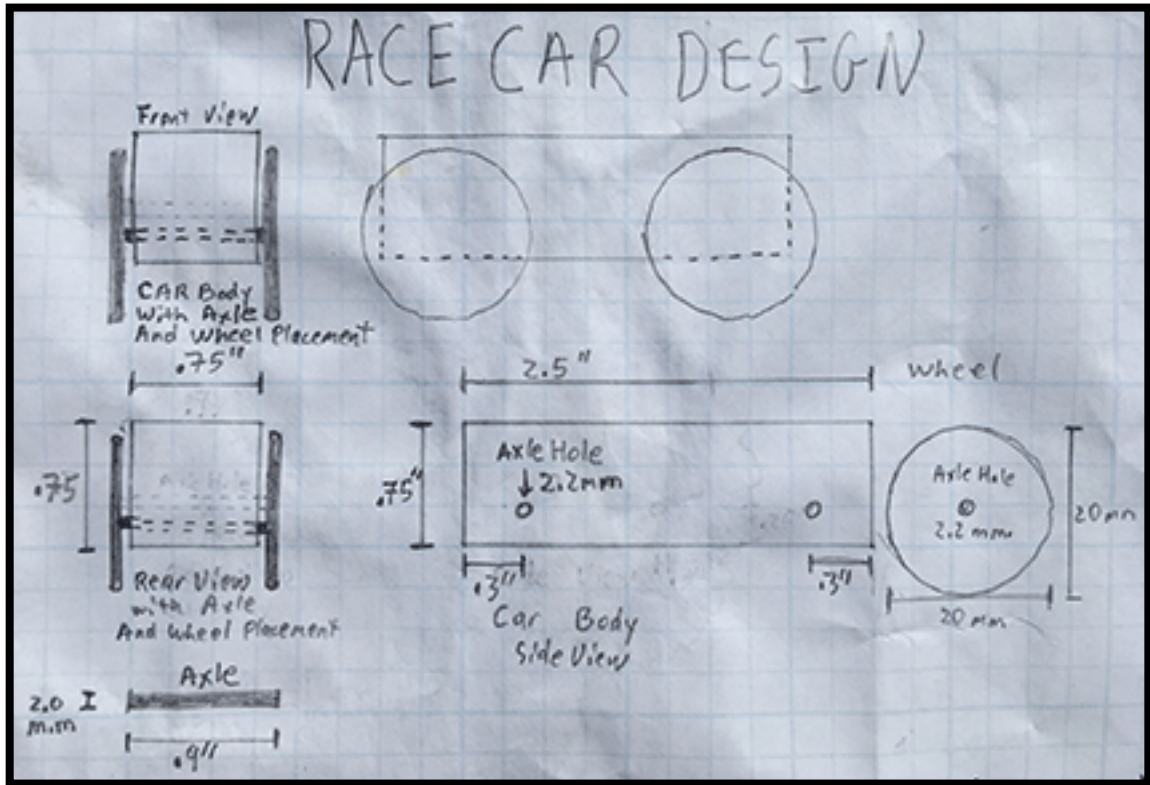


Competition #1: "Fastest Race Car"

Design - Draw Car to Scale on Draft Paper. (40pts.)

Student Teams will discuss and begin drawing their "Race Car" and then begin the process of drawing it on drafting paper (will be provided to you). Keep the design and development of this car very simple - the goal is for you to build and begin racing a car as soon as possible. There are a few specifications that all "Race Cars" must adhere to:

Specifications: (Maximum Car Dimensions)	Drawing: (View Model Drawing below.)
<ul style="list-style-type: none"> ○ Height: .75 inches (Body of the car, not including wheels.) (5pts.) ○ Width: .75 inches (Body of the car, not including wheels.) (5pts.) ○ Length: 2.5 inches. (5pts.) 	<p>Your drawing must contain:</p> <ul style="list-style-type: none"> ○ Front View with Wheels, Axle and measurements. (5pts.) ○ Rear View with Wheels, Axle and measurements. (5pts.) ○ Side View with Wheels, Axle holes and measurements. (5pts.) ○ Axle with measurements (5pts.) ○ Wheel with measurements (5pts.)



Computer Aided Design - Construct the "Fastest Race Car" Using Tinkercad (80-100 pts.)

Students must complete their "Race Car" drawing and show it to the instructor prior to building it in Tinkercad.

The instructor will then export and print the pieces of the student's "Race Car" on a 3d Printer; the student will assemble the car. Student gets full credit when their "Race Car" prints correctly.

Note: Please review the following issues to insure that your "Race Car" will print successfully:

1. Group the body of the car and the cylinder so that the hole will appear and print.
2. Make sure that the diameter of the axle of the car is a little bit smaller than the diameter of the hole so that the wheels can turn easily.

Scoring:

Teams will be placed in brackets of 4 teams.

Each bracket will race three times. The teams will be given a score (1-4) following each race. At the end of the five rounds, the scores for each team will be added up and divided by 5. That score will determine placement and grade.

Winner = 100 pts.

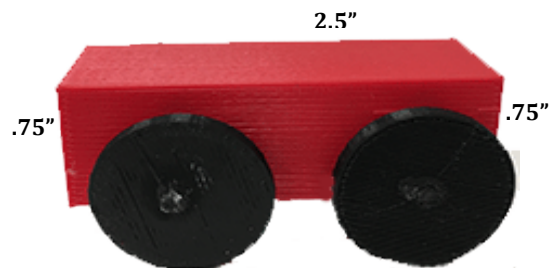
2nd Place = 95 pts.

3rd Place = 90 pts.

4th Place = 85 pts.

5th Place = 80 pts.

All cars are guaranteed at least 80 pts. if they successfully cross the finish line 3 times.



Competition #2: "Coolest Race Car – The Nicest Design."

Design – Draw Car to Scale on Draft Paper. (40pts.)

The "Coolest Race Car" may not be fast, but will be voted on by the class as having the nicest design. Student Teams will discuss and begin drawing their "Cool Car." Once they have a concept, begin drawing it to scale on the drafting paper that will be provided to you. There are a few specifications that all "Cool Cars" must adhere to:

Specifications:

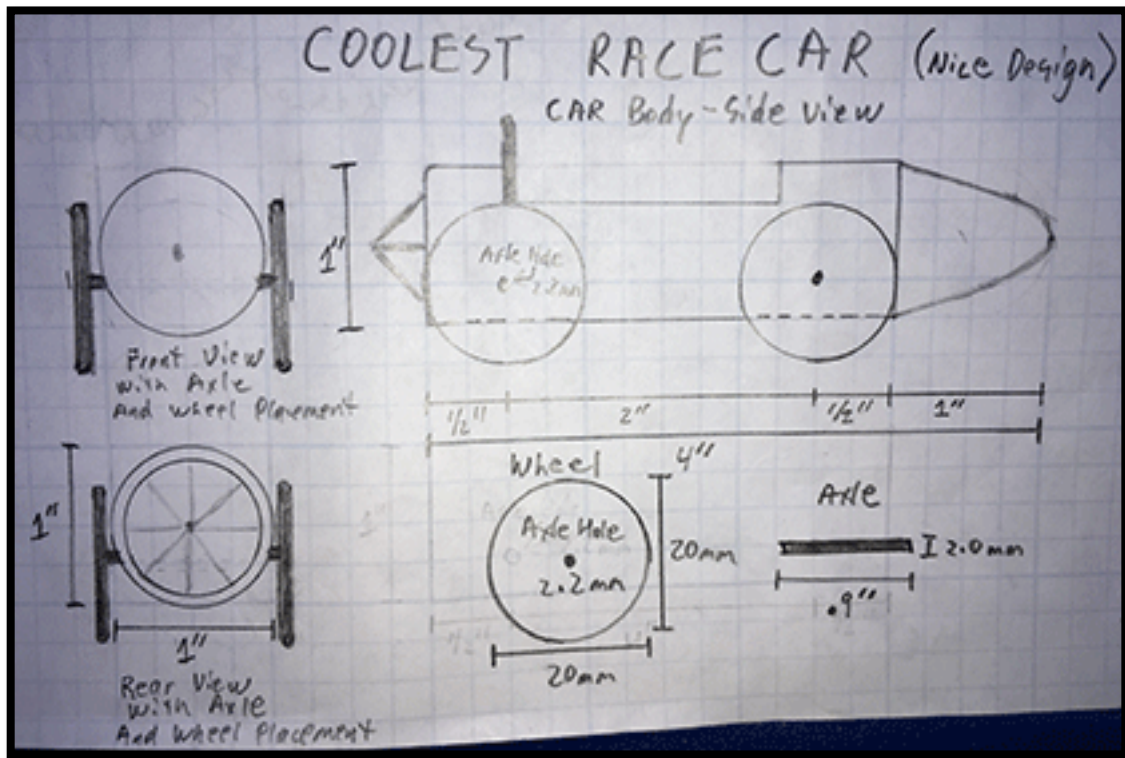
Maximum Car Dimensions:

- Height: 1 inch (Body of the car, not including wheels.) (5pts.)
- Width: 1 inch (Body of the car, not including wheels.) (5pts.)
- Length: 4 inches. (5pts.)

Drawing: (View Model Drawing below.)

Your drawing must contain:

- Front View with Wheels, Axle and measurements. (5pts.)
- Rear View with Wheels, Axle and measurements. (5pts.)
- Side View with Wheels, Axle holes and measurements. (5pts.)
- Axle with measurements (5pts.)
- Wheel with measurements. (5pts.)



CAD (Computer Aided Design) – Construct "Race Car" Using Tinkercad (50-100 pts.)

Students must complete their "Race Car" drawing and show it to the instructor prior to building it in Tinkercad.

Students will build their "Cool Car" using Tinkercad. When they are done, they will submit it to the instructor for review. The instructor will then export and print the pieces of the student's "Cool Car" on a 3d Printer; the student will assemble the car. Student gets full credit when their "Cool Car" prints correctly.

Although we will also race these cars, the points will be acquired by the cars design voted on by the class, not the car's speed.

Scoring:

- Winner = 100 pts.
- 2nd Place = 90 pts.
- 3rd Place = 80 pts.
- 4th Place = 70 pts.
- 5th Place = 60 pts.
- 6th Place = 50 pts.

