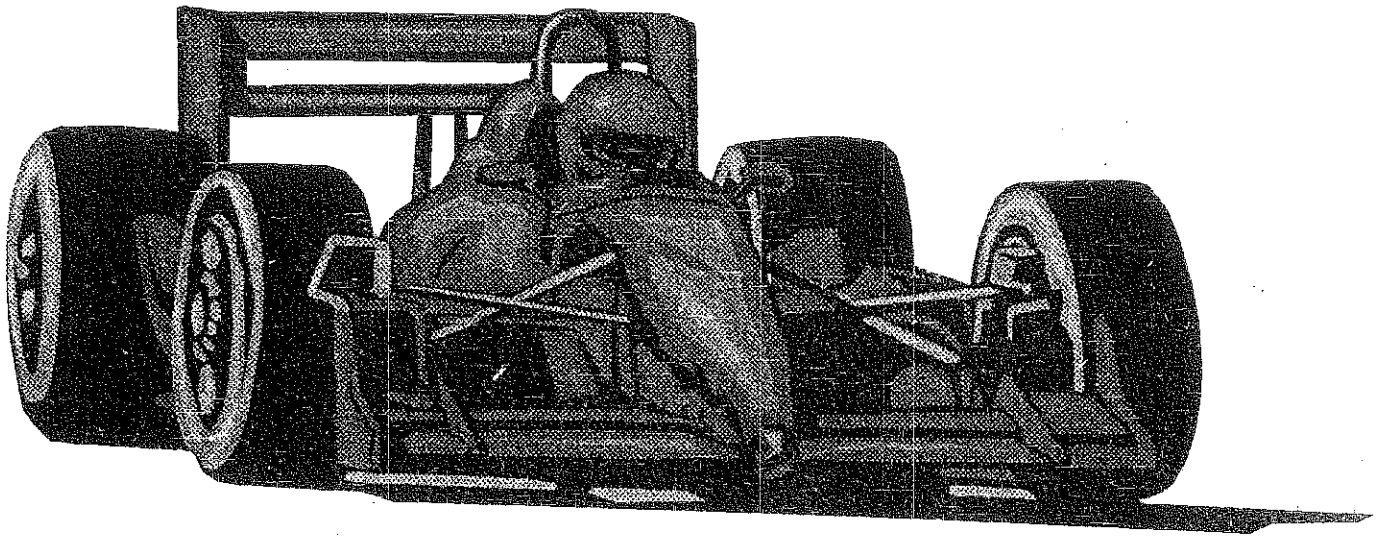
Transportation Technology



Name:

Section:

Student: _____ Phase: _____

Transportation Technology
Table of Contents/Student Evaluation

Total = /

Grade = /

Student Name _____

Transportation Technology
Tech Questions

1)

a) Construction
b) Transportation
c) Communication
d) Manufacturing

* The four different modes of transportation include _____, _____, _____, and _____.

2)

a) solar
b) air
c) water
d) land

* Most vehicles are designed to travel in/on one mode of transportation. Hovercrafts, however, ride on a cushion of air and can travel on both _____ and _____.

3)

a) water
b) space
c) air
d) land

4)

a) Meteorology
b) Aeronautics
c) Aerodynamics
d) Transportation

* The prefix **aero-** means "of the _____".

5)

a) blockage
b) drag
c) stall
d) flux

6)

a) 1776
b) 1889
c) 1903
d) 1913

* Believe it or not, Nicholas Cugnot of France built the first unofficial automobile in 1771. It was powered by a _____engine and could only travel 2.3 mph.

7)

a) steam
b) electric
c) internal combustion
d) rotary

8)

a) Eli Whitney
b) Henry Ford
c) Eiji Toyoda
d) Karl Benz

* He built his first Model A automobile in 1903. However, this car was custom built and not mass-produced. His slogan was; " A car for everyone, as long as it comes in _____."

9)

a) hydrogen gas balloon
b) oxygen gas balloon
c) helium gas balloon
d) hot-air balloon

* Believe it or not, the first aeronauts were not human beings, but included a rooster, a goat and two chickens. Upon landing, the _____ accidentally stepped on and broke the _____ wing, thus becoming the first aeronaut to be injured in flight.

10)

a) gasoline
b) electric
c) steam
d) oil

* By the way, the Trevithick managed only _____ mph when fully loaded.

11)

a) the Montgolfier Brothers
b) Chuck Yeager
c) the Wright Brothers
d) Jakob Bernoulli

* The first actual takeoff of an engine-powered airplane was by a Frenchman named _____ _____ in 1890. The wheels only came off the ground a few inches and the flight only covered 160 feet.

12)

a) all were developed in the United States
b) all were powered by a steam engine
c) all were successful in their first attempt
d) all were invented by the same person

* The _____, the first successful steamboat was built by Robert Fulton in 1807.

13)

a) Mercury
b) Gemini
c) Apollo
d) Skylab

* Just like the first aeronauts were not human beings, neither was the first astronaut. On January 31, 1961, a chimpanzee named _____ became the first successful passenger in space.

14)

a) Supersonic Transport
b) Maglev
c) Amtrak
d) Hovercraft

15)

a) Hovercraft
b) Alcyone
c) Hydrofoil
d) Barge

You're A Designer!

Design, Build and Race your own Race Car!

It's all up to you, this packet will help you design, build and race your own miniature race car. The drivers at Indianapolis, the mechanics at Daytona, and the automobile designers in Detroit all had to start somewhere, they all started small.

The car you will design and build is very much like a miniature dragster. The car will be run through three rigorous test; the Gravity-Feed Track, the Wind Tunnel, and the CO2 track. As build your race car, try not to cut corners. It will have a better chance of looking good and going fast if you design and build it step by step as suggested.

The Design Process

To make your job a little easier, you should design and build your race car in five easy steps. We call this the "*Design Process*". Using the Design Process listed below helps to ensure that a quality car will be produced.

Step # 1 Thumbnail Sketches: This is the brainstorming step. Here many small drawings are made which represent a variety of different ideas. The positive and negative aspects of each car is not a major concern at this point.

Step # 2 Rough Sketches: Rough sketches are more detailed drawings of what your cars will look like and are drawn showing both a top and a side view. At this point, students should begin to think about the positive and negative aspects of each of their designs.

Step # 3 Final Drawings: Upon evaluating each of the Rough Sketches, one final design is chosen. The student then completes a Final drawing of that design. Final Drawings are the most detailed type of drawings and will show exactly what your car will look like.

Step # 4 Prototype: A prototype is the first model of a product, generally intended for testing purposes. Each student will complete a wooden prototype of their final design.

Step # 5 Testing: The final step is the testing stage. Testing helps to determine how well the car (prototype) has been designed.

WHAT'S THE SCOOP?

Now, Here's the deal!

It's your job to design and build a race car that will perform the best throughout the three different types of races. Remember, each race is suited towards a different type of car. The Wind Tunnel favors a car that is sleek and aerodynamic, the Gravity Feed Track favors a car that is extremely heavy, and a relatively light car will do best on the CO2 Track. So your job is simple, you just have to build a heavy car that is light and aerodynamic.

What do I need to know?

Before you begin designing your vehicle there are a few design specifications that you should adhere to. They are as follows:

Length - the finished car must be at least 250 mm in length.

Width - the finished car must measure at least 30 mm wide in two of the three sections of the car (front axle, middle, and rear axle). *This measurement does not include the width of the wheels.*

* The middle section of the car (between the front and rear axles) must measure at least 10 mm.

Height - the finished car must measure at least 50 mm high in the rear section of the car. *This measurement is made with the wheels in place.*

Weight - the finished car may not weigh more than 320 grams nor less than 80 grams. *This measurement does include the wheels.*

Engine Mount - the placement of the engine mount hole will be predetermined by the instructor and will remain standard throughout the school year (+ or - 5mm).

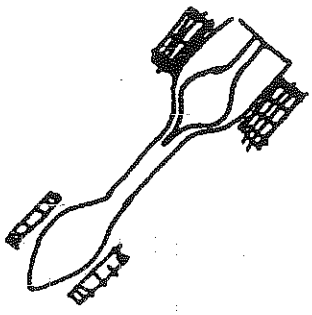
Axle Holes - the placement of the two axle holes will be predetermined by the instructor and will remain standard throughout the school year. However, a tolerance of 10 mm is allowed for each axle if required by any new design.

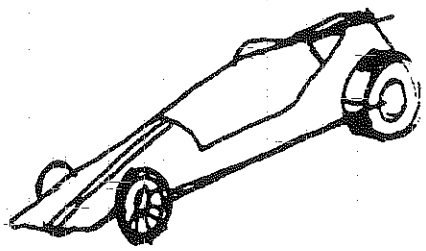
* Failure to meet any of the above specifications does not mean disqualification, it simply means that some penalty points will be deducted from your Final Score. One point will be deducted for every 2mm or 2 grams that you exceed the given ranges.

THUMBNAIL SKETCHES

Thumbnail sketches are simply very small sketches made on paper. They are called thumbnails because they are so small. These are not detailed drawings, just quick sketches which give you the greatest variety of ideas.

Your thumbnail sketches do not have to be a masterpiece. Keep them simple. Use the space provided below to draw six different ideas. Here are some examples.

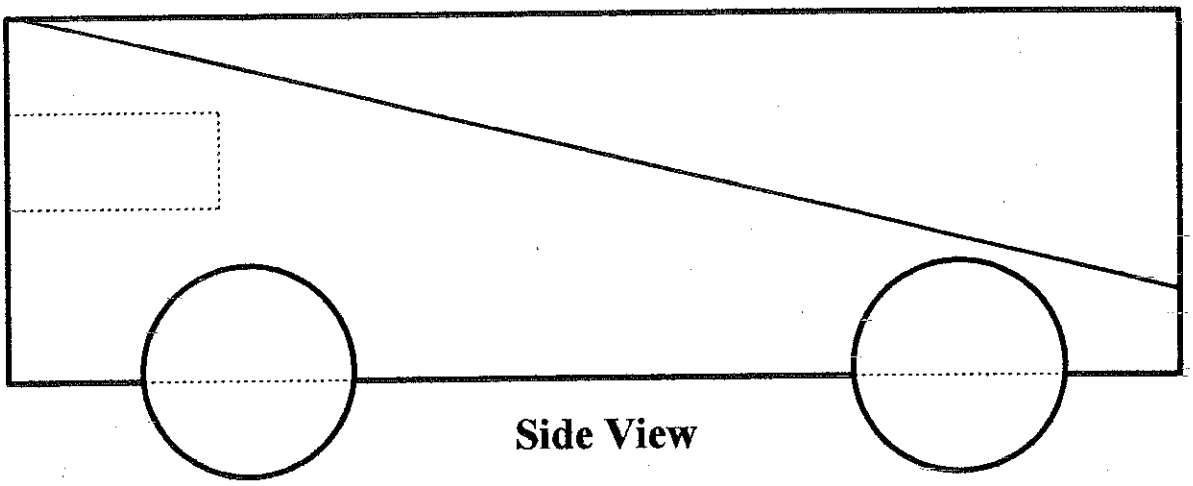




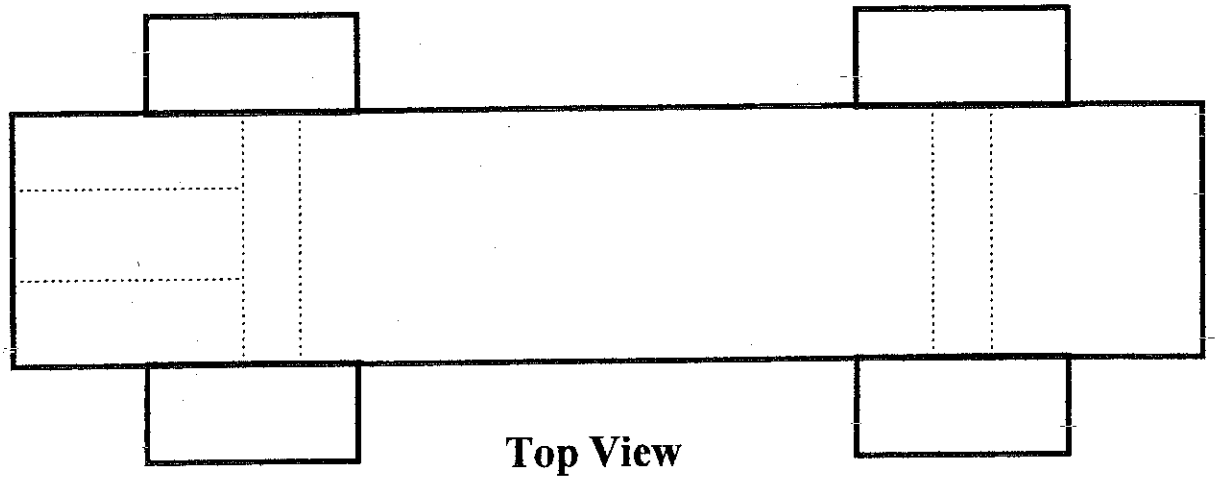
ROUGH SKETCHES

Rough sketches are more detailed drawings of what your car will look like. They are larger than thumbnail sketches and will show your car from two different points of view.

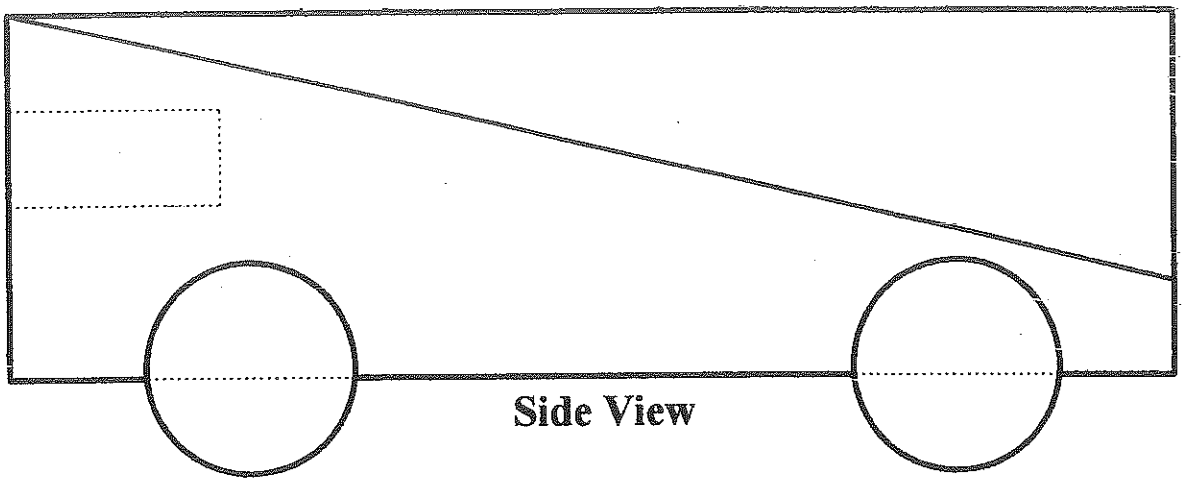
Look over you thumbnail sketches and choose the best three ideas. Try to use a variety of different designs, rather than sketching three versions of the same design. Draw a top and side view of each of the three ideas.



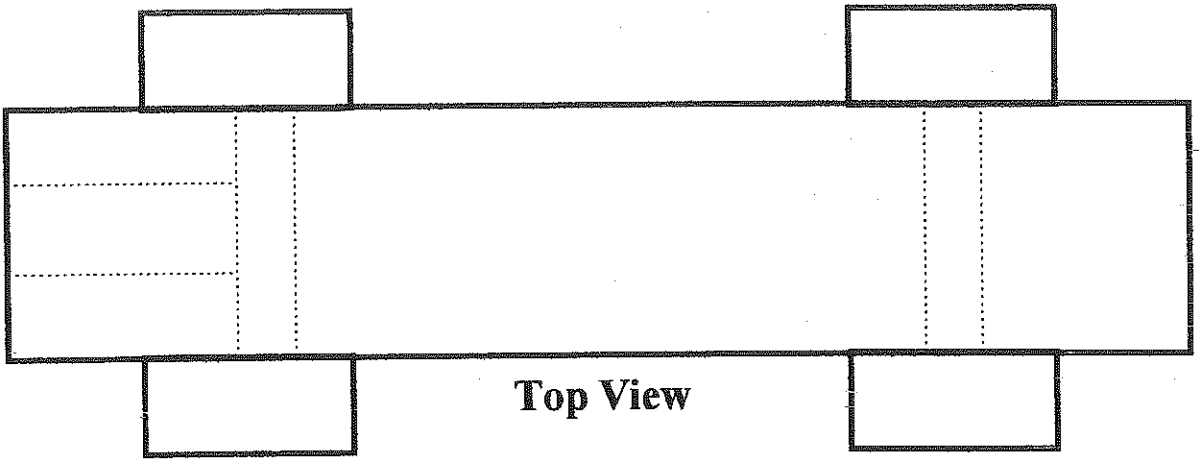
Side View



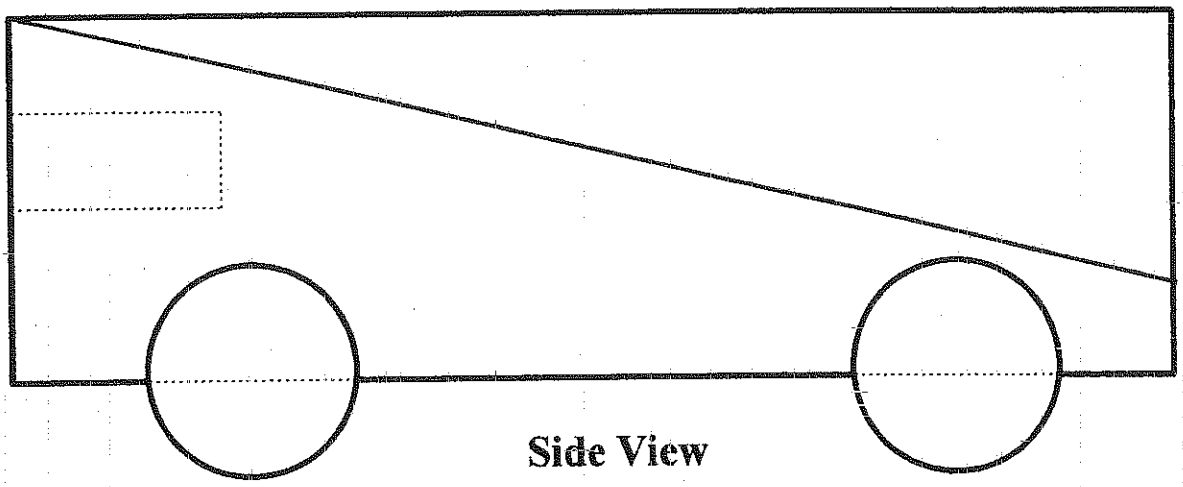
Top View



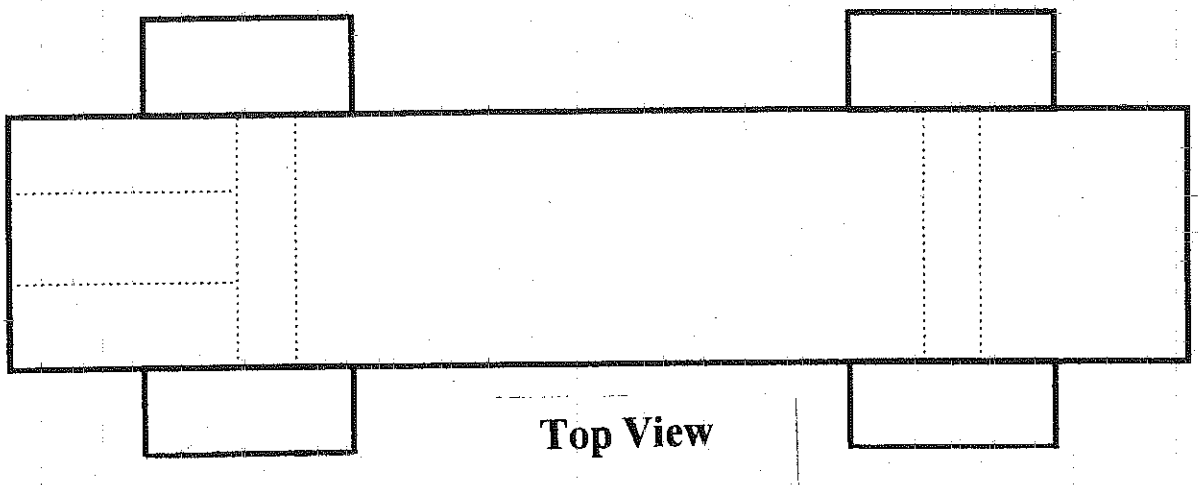
Side View



Top View



Side View

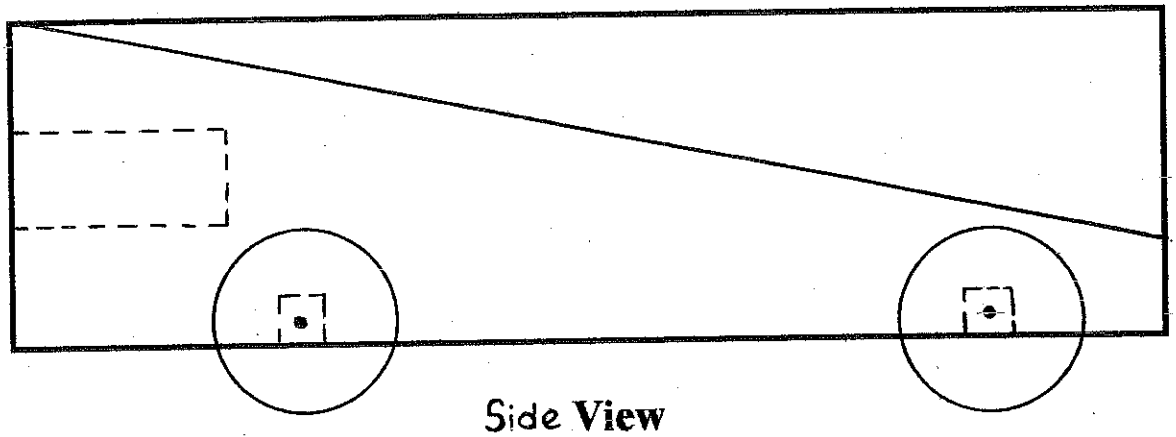


Top View

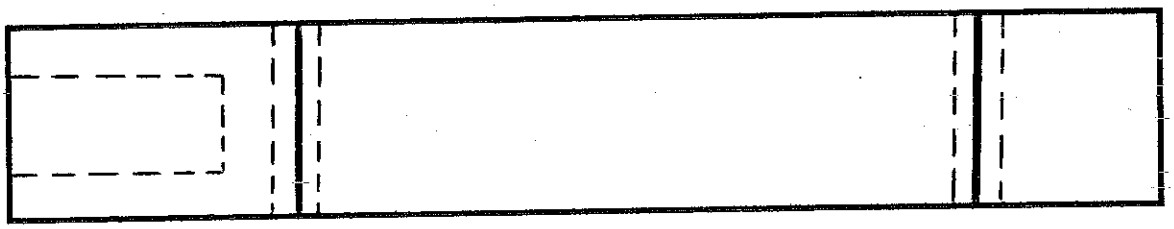
FINAL DRAWING

Now you have reached the Final Drawing stage. This is the last step before making the prototype. Final drawings show all of the details of your car and are drawn to exact scale. Choose the best of your three rough sketches, and carefully draw this design in the area provided below. This drawing should be very neat and exact.

When completed, have your instructor approve the design before starting the Final Template. This template will then be used as a pattern to produce the prototype your car. Take you time, any mistakes you make at this point can be transferred to your final product!



Side **View**



Top **View**

Instructor's Signature _____

Transportation Technology Name _____

Comprehensive Race Results

General Information

Weight of Finished Car = _____ grams
Length of Finished Car = _____ mm
Width of Finished Car = _____ mm
Height of Finished Car = _____ m
Total Number of Penalty Points = _____

Wind Tunnel Test

Wind Tunnel Drag #1 = _____ grams
Wind Tunnel Drag #2 = _____ grams
Wind Tunnel Drag #3 = _____ grams
Average Drag = _____ grams Total Wind Tunnel Score = _____

Gravity Feed Track Results

After each round of races, write in the results of that round in the appropriate blank. The statement should begin with one of the following: Bye, Defeated "Student Name", Defeated by "Student Name", or Eliminated by "Student Name".

Race #1 - Result = _____
Race #2 - Result = _____
Race #3 - Result = _____
Race #4 - Result = _____
Race #5 - Result = _____
Race #6 - Result = _____
Race #7 - Result = _____
Race #8 - Result = _____ Gravity Feed Points = _____

CO2 Race Track

Race #1 - Result = _____
Race #2 - Result = _____
Race #3 - Result = _____
Race #4 - Result = _____
Race #5 - Result = _____ CO2 Race Points = _____

Total Competition Points = _____

Transportation Technology Name _____

Class: Odd Even

Course Evaluation

1. List two specific concepts (key knowledge) that you have gained throughout this course. This is something that you now know that you did not know before you began the course.

   a.

   b.

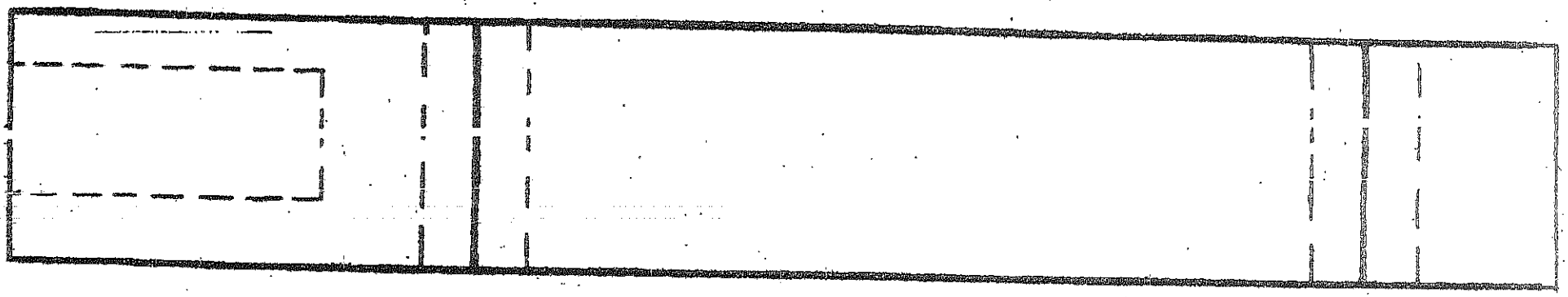
2a. Which track did your car prove to be the most successful?

   b. Did you expect this result?

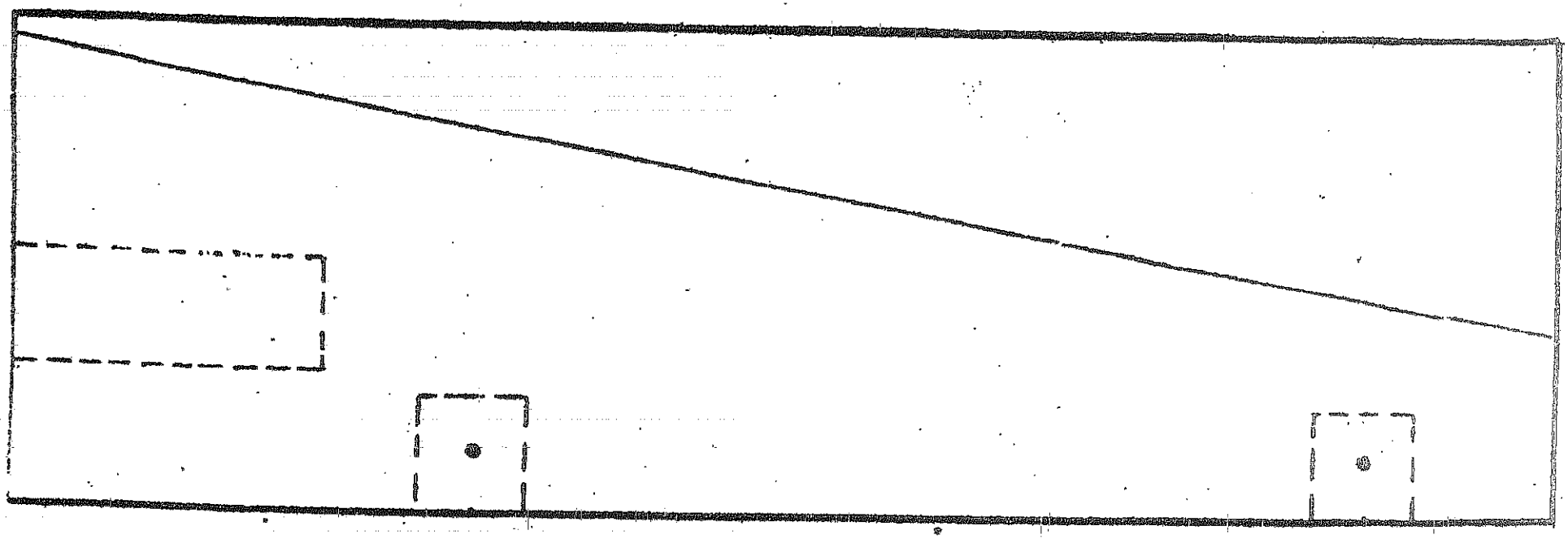
   c. What one aspect of your car would you say attributed the most to this success?

3. If you were given the opportunity to design another car, what one thing would you do the same?

4. If you were given the opportunity to design another car, what one thing would you do differently?



Top View



Side View

Final Drawing Template