

# Pioneer 600 Contest Rules

University of Wisconsin – Platteville

Annual "Pioneer 600" Contest (since 1978)

Contest Held During Engineering Expo

see: <http://www.uwplatt.edu/expo> for dates

The Pioneer 600 is a contest for high school students in which each contestant constructs and races a battery powered car. Competitors can build a car of any design they wish, provided the car meets the specifications in this instruction manual. The car that travels 20 feet (600 cm) in the least amount of time wins. Prizes will be awarded for first, second, and third place winners. In addition, awards will also be given to the person with the best looking car and the person with the most innovative design.

The race is conducted on a straight horizontal double track, with each car making two runs, one in each lane. The elapsed time of each run is calculated and recorded by a computer which is connected to the starting gate, and a sensor on the finish line. The fastest time of the two runs is the recorded time for that car. The track has a rubber racing surface and guides to keep the cars on track (see Figure 1). There is more about how the race is conducted and officiated in part V of the rules.

**Note:** Any surplus money left after the purchase of the prizes and materials will be used as scholarship money in the Mechanical Engineering Department at UW Platteville, and to support the UW Platteville chapter of the Society of Automotive Engineers.

## I. Contents of the kit:

The official UW Platteville supplied car kit includes:

- 1) (2) axles: music wire
- 2) (1) DC motor: **4.5 volt**
- 3) (1) slide switch
- 4) (4) wheels: 1-1/8 inch diameter
- 5) (1) body: 1"x2"x6" balsa wood block
- 6) (1) wire: approximately 12 inches long
- 7) (1) box

The electric motor and switch supplied in this year's kit MUST be used. All other components can be substituted (ie. use of a plastic frame instead of a wooden body) provided the design requirements in section II are satisfied. **Electrical components other than those provided in the box are NOT allowed this year.**

## II. Design Requirements:

Competitors may build a car of any design they wish, but all cars must meet the following requirements.

- 1) The electric motor used MUST be from the current year's kit supplied by UW -- Platteville. No modifications to the motor are allowed. Motors from other years may not be used.
- 2) The only source of energy allowed will be (not more than) **THREE** "AA" or "AAA" batteries. Batteries are not included in the kit.
- 3) Track dimensions are detailed in Figure 1. The maximum width of the car MUST NOT exceed the maximum width shown in Figure 1. Cars which exceed this width will not fit on the track, and will not be run.\*
- 4) The wheel base (distance from front axle to rear axle) MUST NOT exceed six inches.
- 5) Operation of the electric motor MUST BE controlled by the switch provided in the kit (see Figure 2). No other electrical components will be allowed.
- 6) Use either of the two sets of the parallel contacts on the slide switch. Each has three contacts: common, normally on and normally closed. Refer to Figure 2 for suggested connections.
- 7) The wires connecting the motor must be soldered into place for a proper connection.

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\* Note: in the past, when possible, oversize cars were run by straddling both lanes. This cannot be done on the new track.

### **III. Track Parameters:**

- 1) The track has starting gates which start the computer timers when opened. The timers are turned off by sensors when the car crosses the finish line, located 600 cm (20 feet) from the starting gate.
- 2) The track is straight and horizontal.
- 3) The track has two separate lanes and corresponding timing systems. Both starting gates release the cars simultaneously.

### **IV. Eligibility:**

The only eligibility requirement is that the participant is presently enrolled in high school.

### **V. How the Race is Conducted:**

- 1) Each car will be run on both lanes. The fastest time of the two runs will be used for scoring. Only two official runs will be allowed for each car. In order for the run to count, the car MUST remain on the track and complete the run by crossing the finish line.
- 2) One practice run per car will be permitted. Official runs must be declared prior to running.
- 3) Winners will be determined by the minimum elapsed time of the official runs.
- 4) To begin the race the car will be placed against the starting gate. The motor will be switched on and then the gate will be opened.
- 5) The starting gate will hold back the car at the center of the front end of the car. The starting gate will NOT contact the wheels.
- 6) Cars will absolutely NOT be repaired by the officials and/or operators of the track. In the unlikely event of a tie, equal prizes will be awarded.
- 7) Judges will consist of two UW Platteville mechanical engineering students. Decisions of the judges will be final.
- 8) Teachers may request a final “standings” list for grading purposes after the prize ceremony at 1:45PM.

### **VI. Suggestions:**

- 1) Selecting the best gear ratio to optimize motor efficiency is the key to winning.
- 2) Friction in the drive train should be minimized.
- 3) Alignment of the axles is very important.
- 4) A light weight model will accelerate and reach its maximum speed quickest.
- 5) The wheels provided work well, since the track surface is rubberized. Other wheels (rubber wheels, Lego wheels, etc) tend to catch on the track guides.
- 6) Some batteries are better than others. Do not overheat the motor.

## **VII. Prizes:**

- 1) The three fastest cars will be awarded UWP sport bags as prizes. Expo tee-shirts will be awarded to 4<sup>th</sup> through 20<sup>th</sup> places.
- 2) The best looking car which successfully completes the race will receive a UWP sport bag.
- 3) The most technically innovative car design which successfully completes the race will also receive a UWP sport bag.
- 4) Only ONE prize will be awarded to a contestant.
- 5) Prizes will be awarded on the day of the contest, after the contest is complete (approximately 1:45PM).

## **VIII. How to Enter:**

- 1) Bring your model car (with the registration form) to room 140 Ottensman Hall during Engineering Expo.

OR

- 1) Mail your car (without the battery connected) and the registration form to:  
Pioneer 600  
College of Engineering, Math and Science  
University of Wisconsin Platteville  
Platteville, WI 53818
- 2) Do not send in the registration form unless it is accompanied by your car.
- 3) All of the cars MUST be received before 11:00 AM on the day of the contest.
- 4) For more information, write to the above address or contact Dr. Jeff Hoerning at (608) 342-1437. Note: due to prior commitments, Dr. Hoerning will not be available on race day.

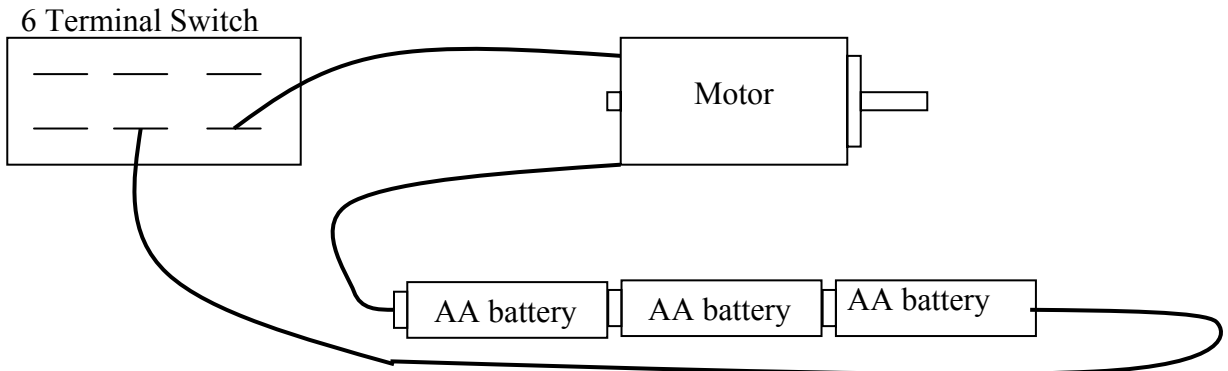
## **IX. Return of Cars by Mail:**

- 1) Those who cannot attend the contest and would like their cars returned should send their car individually packaged with the correct return address permanently written on the body of the car. Include \$1.00 for postage and handling.
- 2) Cars being judged for the best looking and most technically innovative will have to stay until the end of the day. If you must leave the contest and your car is being considered for an award, we will mail it back to you for \$1.00 postage and handling.

Attachments:

Track dimension, registration and suggested wiring guide.

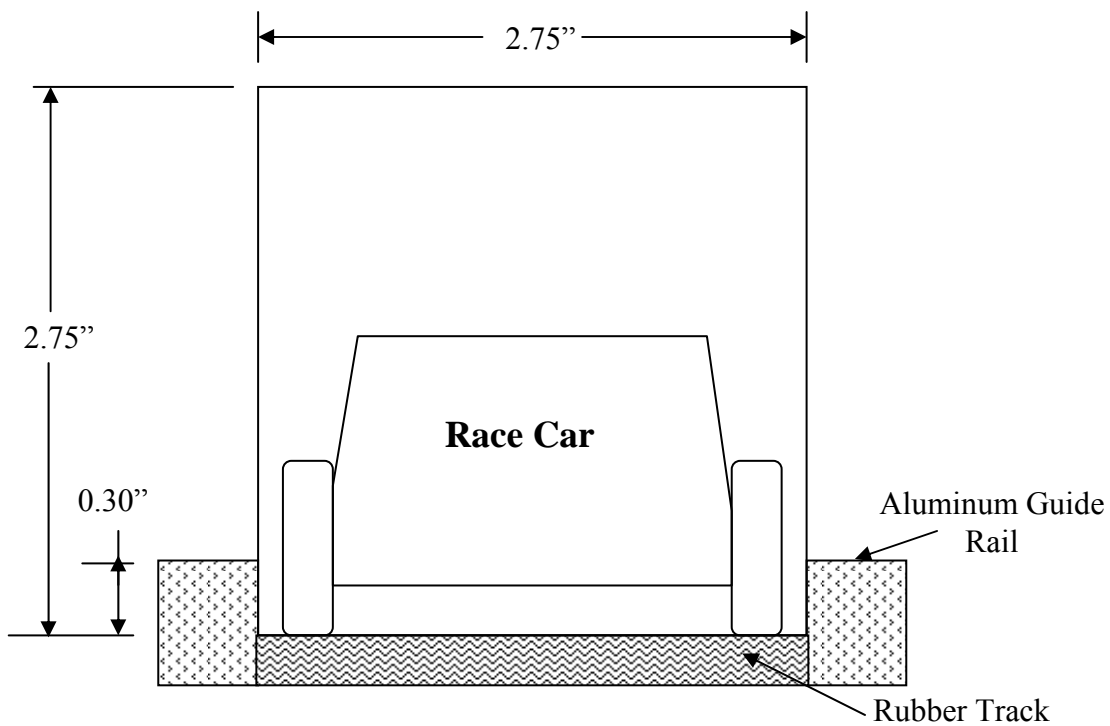
## Suggested Wiring Diagram



The 3 and 2 terminal switches are wired similarly.

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## Track Dimensions



In order to get the car through the starting gate, the car should fit through a 2.75" x 2.75" opening. Cars that don't fit through this opening will not be able to compete. The aluminum track guides are 0.25" (1/4") tall.

## REGISTRATION

Leave this space blank

Please print clearly and include this registration card with your car.

Name of Car Builder: \_\_\_\_\_  
(Person who will receive prize)

Teacher/Advisor: \_\_\_\_\_

Name of High School: \_\_\_\_\_

High School Address: \_\_\_\_\_  
\_\_\_\_\_

Note: only one prize per car will be given. Please only list one name. Also, any prizes not picked up at the end of the race will be sent to you via your school. Please print neatly.

Cut here

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