



# **Delaware Technology Student Association**

**2016**

## **MAGNETIC LEVITATION VEHICLES**

### **Delaware Only Competition**

*"SERVING TECHNOLOGY EDUCATION STUDENTS"  
SPONSORED BY THE DEPARTMENT OF EDUCATION*

Updated 10-15-2015

## MAGLEV VEHICLE RACE

**Overview:** Delaware TSA students entering the Maglev vehicle race are required to design and construct a vehicle which will levitate and balance over a 16 foot long magnetic track and will be moved down the track by a single D. C. motor with a propeller. (The track sides are electrified by an 18-volt transformer.) Students will be judged on time trial results, originality of design and aesthetic value. **The challenge in 2016 is to build a Maglev vehicle that will race at the greatest speed.**

**Contest Purpose:** To provide a means for TSA members to demonstrate their understanding of a practical application of magnetic levitation through the design and construction of an original Maglev vehicle within a set of track/vehicle specifications. The contest rules and specifications will be based on the Maglev competition guidelines (attached).

**Eligibility for Entry:** One Maglev Vehicle per individual student.

**Levels of Competition:** Level I and Level II.

**Time Limitations:** *Home School Preparation* - vehicle must be submitted during event registration.

### Specific Regulations:

- a. Vehicle shall be suspended solely by means of magnetic levitation. Conductive wires may not rest on the top of the rails.
- b. Entire vehicle must be at least 1.5" tall and 12" or less in length.
- c. There is no maximum height, nor minimum length restrictions.
- d. The magnetic polarity must be compatible with track specifications. There is no limit to the number of magnets which may be affixed to a vehicle.
- e. Students will be allowed to adjust and place magnets to track magnets at competition site prior to initial track competition.
- f. The track will be 16 feet long (14 ft race length) and powered by a 12 to 18 volt transformer. See included diagram for track specifications.
- g. Vehicle must be powered by one DC motor as available from such vendors as Kelvin, Pitsco, Radio Shack, etc... and one propeller (Example is a **Kelvin #850647 3-6v 17,000 rpm motor**). Power must come completely from the electrified track.
- h. Once competition begins, after testing phase is over, no repairs and/or modifications can be made. If a vehicle becomes inoperative, it will be eliminated from competition.
- i. Body material is to be supplied by contestant. Choice of material is the option of the contestant.
- j. **Schools must provide all materials including motors and propellers for competition.** No on-site construction is allowed; however, modifications and adjustments can be made prior to on-track competition.
- k. Students must wear eye protection during the adjustment, testing, and competition periods.

### Resources:

Each entry must supply all of the necessary parts/tools/supplies to make repairs and/or adjustments on site; before competition begins. **No tools will be provided by DETSA on site.** Tables to work on will be at the site.

**Procedure:**

- a. Students will work individually to construct and design a maglev vehicle.
- b. The Maglev will then be judged on originality, appearance, design specification and race time.
- c. Students must be present when racing the vehicle.
- d. Students will have time to arrange and affix their magnets according to the track's polarity before racing.
- e. Students will have three race attempts - if vehicle is not able to run, it will be rated as "Did not finish."

**Criteria for Judging:**

- a. Originality, design, and appearance ..... **25 pts.**
- b. Race times ..... **50 pts.**
  - 1st - 50 pts.**
  - 2nd - 45 pts.**
  - 3rd - 35 pts.**
  - 4th - 30 pts.**
  - 5th - etc.**

**TOTAL** **75 pts.**

# Delaware MAGLEV Track Specifications

## Side View

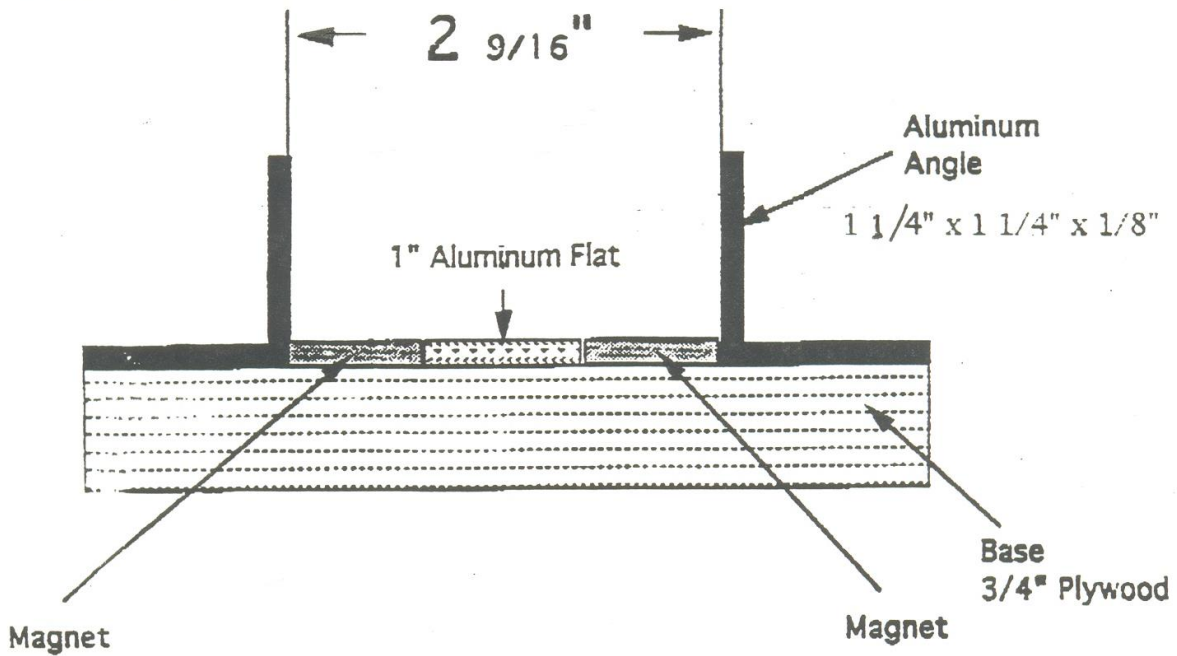


Diagram 5.4 - 2.1

## Top View

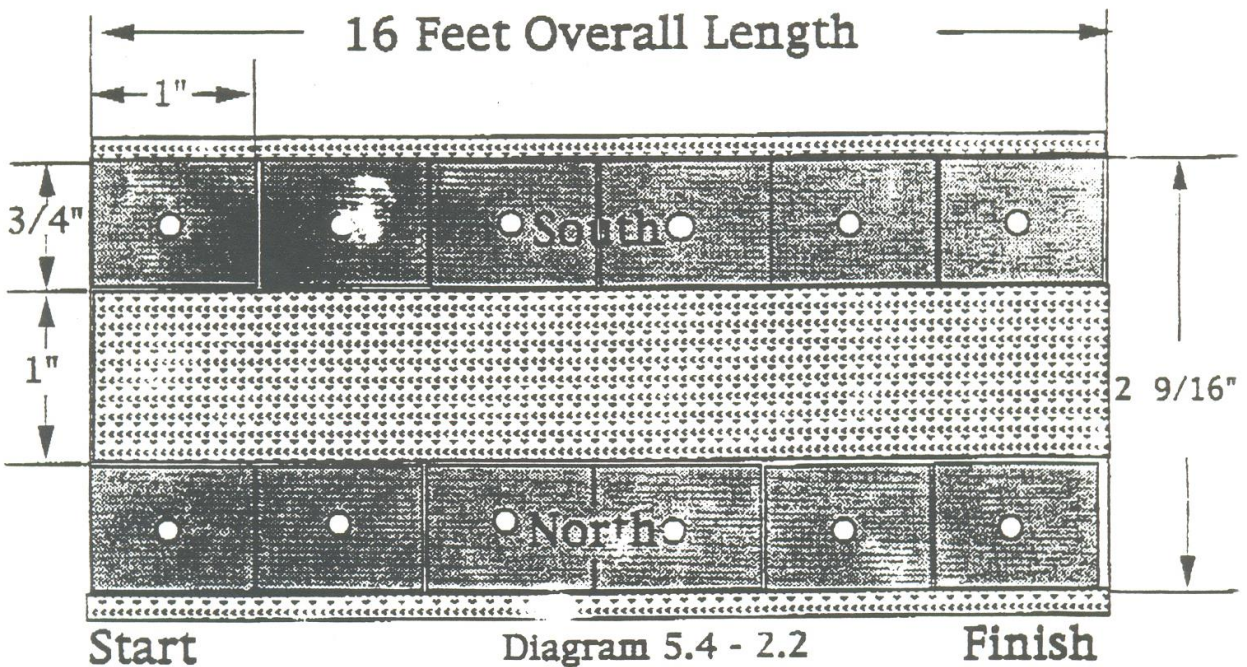


Diagram 5.4 - 2.2

**DELAWARE TSA STATE CONFERENCE**  
**Competitive Event Evaluation**

**MAGLEV VEHICLE RACE**

Student's ID: \_\_\_\_\_ Level: \_\_\_\_\_

Chapter/School No. \_\_\_\_\_

A. \_\_\_\_\_ **ORIGINALITY, DESIGN, & APPEARANCE (25 pts)**

\_\_\_\_\_ Design meets all vehicle specifications ..... **10 pts.**

\_\_\_\_\_ Originality of vehicle design ..... **10 pts.**

\_\_\_\_\_ Overall design appearance & aesthetic value ..... **5 pts.**

B. \_\_\_\_\_ **RACE TIME TRIAL RESULTS (50 pts)**

1st = 50 pts. 2nd = 45 pts. 3rd = 35 pts. 4th = 30 pts. 5th = 25 pts.

\*If vehicle travels the distance but does not make top five times = 10 to 20 pts.

\*Did not finish = DNF (0 pts)

\_\_\_\_\_ *1st time trial*

\_\_\_\_\_ *2nd time trial*

\_\_\_\_\_ *3rd time trial*

\_\_\_\_\_ *Average time*

\_\_\_\_\_ *Rank*

C. \_\_\_\_\_ **RULES VIOLATION (-20 pts.)**

\_\_\_\_\_ **POINT TOTAL**

\_\_\_\_\_ **RANKING**

Judge's Signature \_\_\_\_\_