



Delaware Technology Student Association

2018

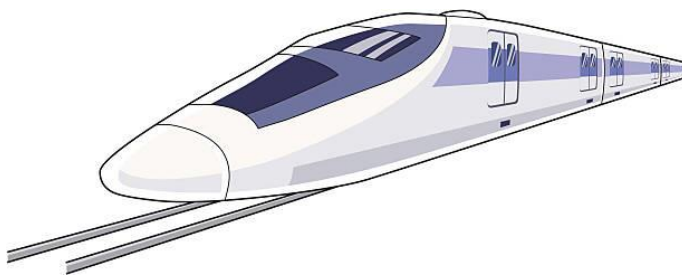
MAGNETIC LEVITATION VEHICLES

Delaware Only Competition

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

Updated - September 17, 2018

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 2018 is to build a Maglev vehicle that resembles a modern bullet train and measures exactly 10 inches in length to 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 (1) DC motor as available from such vendors as Kelvin, Pitsco, 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

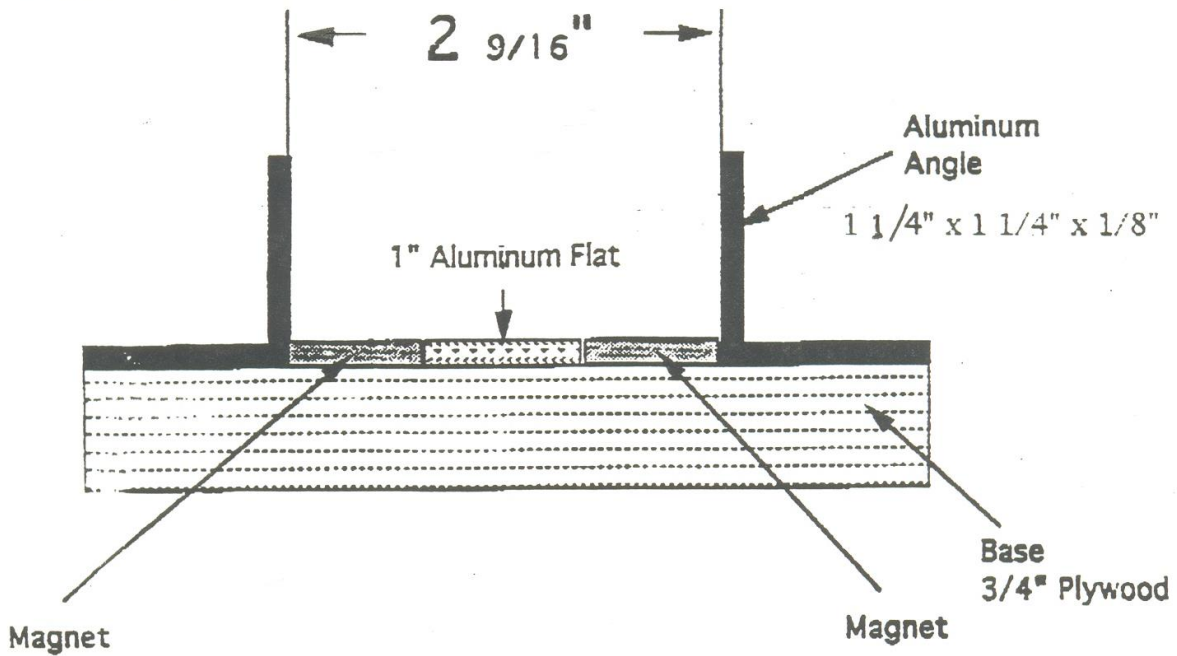


Diagram 5.4 - 2.1

Top View

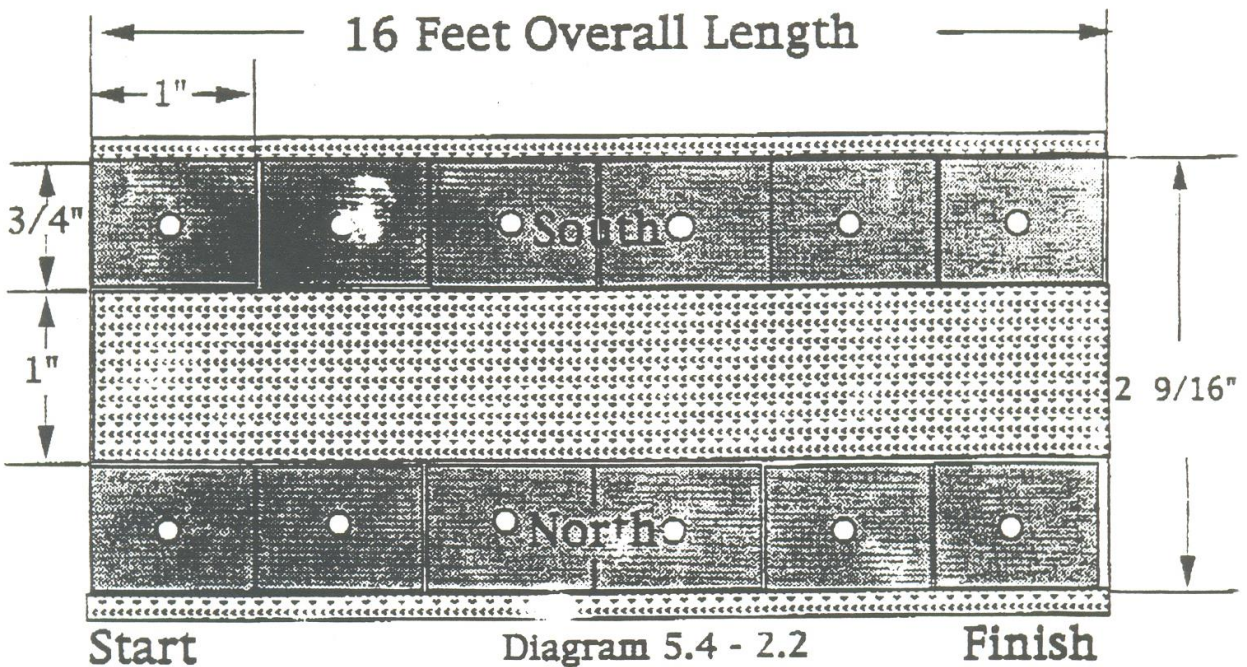


Diagram 5.4 - 2.2

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)

_____	_____	_____	_____	_____
<i>1st time trial</i>	<i>2nd time trial</i>	<i>3rd time trial</i>	<i>Average time</i>	<i>Rank</i>

C. _____ **RULES VIOLATION (-20 pts.)**

_____ **POINT TOTAL**

_____ **RANKING**

Judge's Signature _____