



## SPEED CATEGORIES

The steps in this Design Portfolio will help you complete your MAGLEV vehicle design.

Writing down what you did or what you discovered in each step will help you learn from your work. It will also help the contest judges understand your design approach.

On the day of the contest, you must hand your **completed** Design Portfolio to the judge. Your Portfolio will become the property of BNL.

1) **Student Name:** \_\_\_\_\_

2) **School Name:** \_\_\_\_\_

3) **School address:** \_\_\_\_\_

\_\_\_\_\_

4) **Grade:** \_\_\_\_\_

5) **Teacher name:** \_\_\_\_\_

6) **Teacher e-mail address:** \_\_\_\_\_

7) **Contest Category:**

Wind Powered

Self-propelled

Electrified Track

Gravity

8) **Why did you choose this MagLev category?**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

9) **Problem Statement: The MagLev Challenge**

Design and construct a MagLev vehicle using the propulsion category of your choice. Your vehicle must travel the entire length of the track in the shortest time possible. For the Gravity category, your vehicle must have the **most cost-effective** combination of *speed*, *passenger capacity*, and *cost* as signified by the highest Figure of Merit (FOM).

## 10) Investigation

a) What information do you need to know before you start?

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b) List questions which must be answered to create a successful vehicle.

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c) Can some answers be found by simple tests? Give examples.

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## 11) Brainstorming for Solutions

Write about the different designs you thought of using. For example, what materials it could be made from, the number of magnets, length, height, how to attach parts, etc. (Sketch your ideas on a separate piece of paper, and attach it to this Design Portfolio).

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## 12) Optimum Design:

Describe what you decided would be the best vehicle design, and describe the reasons for deciding on this design instead of the others you had thought of.

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**13) Testing and Analysis:**

a) What tests did you perform to learn how well your first design worked?

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b) Describe any problems that you found with your vehicle and what changes you made to solve them. (Design sketches, performance charts and graphs are very helpful. Attach any to this Design Portfolio).

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**14) Final Design:**

What did you do to improve your first design? How well did this work?

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**15) Evaluation:**

a) Describe/sketch your final design. (If necessary attach sketch to Design Portfolio).

b) Give your best guess on how your vehicle will perform.

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\* Please include your name on every page you attach to this Portfolio and make sure your name is on your vehicle!