Name _____

Period _____

Maglev Unit (100 points)

The purpose of this assignment is to give the students an opportunity to design and build a **Mag**netic **Lev**itation vehicle. Students will also be introduced to some of the concepts and terms related to Maglev vehicles.

Time given to complete: There will be four days given in class to complete this unit. During this time students will be expected to work on a sound design and build their vehicle to meet their designs.

Students will be given a package containing a foam block, magnets, electric motor, propeller, switch, and battery clip to complete their vehicles. At the completion of the unit the materials must be returned so that they can be used for future lessons. The vehicles must be designed and constructed in a way that allows for the disassembly of the parts without damage.

The completed vehicle will travel down a track (approx. 16 feet) containing magnets. The goal is to travel down the track in the quickest time. The grade for this unit will be in two parts. The first part of the grade is based on your plans and construction of the vehicle. The second part of the lesson is based on the speed of your vehicle down the track.

The first part of this unit is to design the vehicle using graph paper and plan how your vehicle will work. Half of your grade for this unit will be based on the design of your vehicle and how close the drawings of your vehicle are to the actual completion of your vehicle.

The second part of this unit is to get your vehicle to travel down the double length of track in the fastest time. Your vehicle will be timed and the results will be recorded and compared to the others in the class. The fastest vehicle will receive 50 points and every person will lose one point for each place they finish behind first. For example: second place will get 49 points for speed and third place will get 48 points.

Maglev Vocabulary

Attraction- Pulling together of the magnet forces- unlike poles of the magnet attract

Repulsion- Pushing away of the magnet forces- like forces repel

Electromagnetic Suspension (EMS) - Attractive forces- vehicle rides above the rails but the magnets wrap under the rails- uses electromagnets

Electrodynamic Suspension (EDS) - Repulsive forces- The vehicle rides above the track with a larger cushion of air between- uses superconducting electromagnets

Advantages/ Disadvantages of Maglev Vehicles

Advantages: Faster travel – can be more than 300 mph

Safer travel – no weather related crashes

- no train collisions because tracks are electrically regulated

Minimal repairs/ maintenance

Less pollution

Can travel up steeper hills than regular trains

Can be built above standard car/ truck roadways

Less fuel costs

Quieter rides

No fuel on board

Disadvantages: Possible magnetic field radiation

Large initial cost to build

Maglev Vocabulary

Attraction-

Repulsion-

Electromagnetic Suspension (EMS) –

Electrodynamic Suspension (EDS) -

Advantages/ Disadvantages of Maglev Vehicles

Advantages:

Disadvantages: