Names: _____ Group #: _____

Velocity and Energy of Magnetic Carts

<u>You will need carts that have magnets attached to one end of the car and make sure they repel each other. Students will follow the directions but will need to select different distances. A good way to start the lab would be to work backwards from KE and try and figure out how to build a data table you would use for this assignment. See example below. You will need to measure the mass of the carts also.</u>

Objective: Collect and analyze data to calculate KE and therefore PE stored in a magnetic field. Observe patterns in data to describe the relationship between PE of the magnetic field and the distance.

Materials: 2 carts, track, magnets, stopwatch, meter stick,

Instructions:

1. One cart is fixed at a position on the track with a magnet on the front.
2. A second cart (which will be magnetically repelled) is placed nearby
3. Measure Initial distance is recorded.
4. Release 2nd cart
5. Measure the distance the cart travels and the time
6. Calculate the resulting velocity
7. Repeat 5 times at different starting distances
8. Calculate associated KE.
9. Using knowledge of energy conservation infer PE stored in the magnetic field.
10. Graph PE vs position.

Formulas to use:

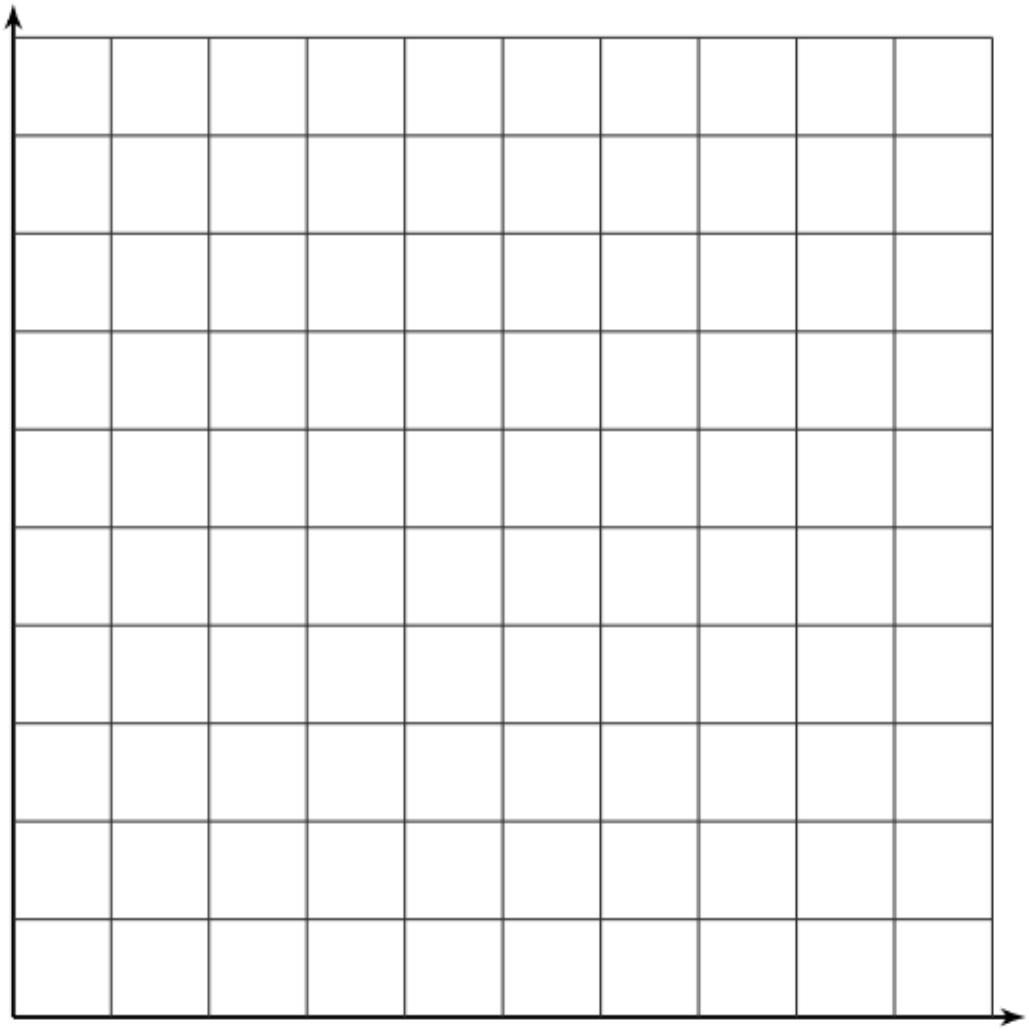
$v=d/t$

$KE=(½)mv^2$

1. Create a data table for the information you are gathering. Make at least 5 different observations (start the cart from 5 different positions and calculate v, KE, and PE)

Trials	Mass (kg)	Velocity (m/s)	KE (joules)	PE (Joules)	Height (m)
1					
2					
3					
4					
5					

2. Make a graph of PE vs. position (distance)



3. What does the graph show?

4. Where does the final kinetic energy of the cart come from?