Name: _____

Date: _____

Period: _____

Lab – Force & Acceleration

Question: How does acceleration change when the same force is applied to objects which have different masses?

Hypothesis (use the term directly or inversely proportional): _____

_____

_____

_____

_____

Procedure:

1. Gather Materials: Triple Beam Balance, 4-wheeled cart, 1-meter string, 1 large ball bearing, 3 weights, plastic cup, meter stick, masking tape, stopwatch
2. Mass cart & Record: _____
3. Mass ball bearing & cup together, Record mass: _____
4. Mass one weight & record: _____
5. Tie string to cart and tape other end to cup
6. Set cart on table, run sting across table so cup hangs over the end opposite cart.
7. Set a start & stop line one meter apart.
8. Place ball bearing in cup & release
9. Measure time for cart to cover 1 meter, Record.
10. Repeat 4 times.
11. Add one weight to cart & repeat procedure.
12. Repeat procedure with 2 weights on cart.
13. Repeat with 3 weights.

Data:

Cart with	Trial 1	Trial 2	Trial 3	Trial 4	Average time
0 weights					
1 weights					
2 weights					
3 weights					

Data Analysis:

If gravity pulls with an acceleration of $9.8 m/s^2$, What force did the cup & ball bearing apply to the cart during each trial?

Name: _____

Date: _____

Period: _____

Lab – Force & Acceleration

Data Analysis:

Cart with	Combined mass (Cart + weights)	Distance Traveled	Average Time (From Data)	Acceleration (see formula below)
0 weights		1 Meter		
1 weights				
2 weights				
3 weights				

Acceleration = distance ÷ (time x time) or $a = d/t^2$

Graph:

How does mass affect acceleration of an object when the force remains the same?

Name: _____

Date: _____

Period: _____

Data Analysis:

Draw a best-fit line on the graph.

Calculate the slope of the line. Slope = rise over run or $s=\Delta y/\Delta x$

Calculate the percent error of your line.

% error = (your measured value – correct value) ÷ correct value x 100

Conclusions:

1. What could we have done during our experiment to make the percent error even smaller? _____
2. How would this have made the error smaller? _____
3. We now have confirmed that mass and acceleration are inversely proportional. What could we do to learn how air resistance affects the acceleration of an object? _____