LAB REPORT
NEWTON'S SECOND LAW

INTRODUCTION:
Sir Isaac Newton studied motion in the 1600's and wrote a book called The Principia. In this work he developed three basic laws of motion, and suggested that the force which returned things to Earth was the same force which held the heavenly bodies in orbit around the Sun. The law which we are studying in this lab exercise is his second law which states that the acceleration of a object is directly proportional the net force on the object and inversely to the mass of the object.

PURPOSE:
The purpose of this lab exercise is to demonstrate that the acceleration of an object is directly proportional the net force on it and inversely proportional to the object's mass. a=F/m. If this is so then the slope of a graph of a vs. 1/m should be the slope of that graph.

PROCEDURE:
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DATA:

mass (kg)	distance (m)	time (s)	accel. (m/s^2)	net force (N)	force due to weight (N)	frictional force (N)
2.858	0.340	1.1536	0.511	1.49	1.96	-0.47
2.858	0.340	1.0644	0.600	1.50	1.96	-0.46
2.858	0.340	1.0896	0.573	1.47	1.96	-0.49
4.920	0.340	1.5902	0.269	1.55	1.96	-0.41
4.920	0.340	1.3969	0.348	1.57	1.96	-0.39
4.920	0.340	1.3737	0.360	1.57	1.96	-0.30
6.420	0.340	1.6152	0.261	1.70	1.96	-0.26
6.420	0.340	1.5449	0.285	1.80	1.96	-0.60
6.420	0.340	1.6160	0.260	1.69	1.96	-0.27

CALCULATIONS:

To find the acceleration:

$d = V_i t + 1/2at^2$
$V_i = 0$ m/s
therefore $a = 2d/t^2$

$a = 2(.340)/(1.1536)^2$
$a = .510$ m/s^2

See Graph:

regression equation from calculator:

$a = 1.51(1/m) + .0026$ [this is made up for demonstration purposes only]

Average net force = 1.58 N

Percent error (Percent difference) $|1.51-1.58|/1.58 = 4.4\%$ (Why use 1.58 N as the accepted value?)

CONCLUSION:

I conclude that Newton's 2nd law is verified meaning that and object's acceleration is directly proportional to the net force acting on an object and inversely proportional to the objects mass and that this is demonstrated when the slope of a graph of the acceleration vs. 1/mass is equal to the net force. In examining my data …. (You should talk about precision and accuracy.. where errors might have come from [You can't just say "human error" you must suggest where, why, and how.] How confident are you in your conclusion.)