F = ma Lab **Period** _____ **Name** _____

Purpose: to see if Newton was on crack or not.

Procedure:
1. Set up air track as shown in class.
2. Add 50-60 grams of mass to the glider using 10 or 20 gram weights. Be sure the masses are distributed symmetrically so the glider is balanced. Determine the mass of your glider **with the hanging masses** and record the total as **(m_{total})** below.
3. Move masses from the glider to the hanger to change the $\mathbf{m_a}$, but not the overall $\mathbf{m_{total}}$.
4. Determine accelerations from lab equipment and record in "a experimental."

Data/calculations: m_{total}=_____kg

Trial #	m_a	F_a	a_{calc}	a_{exp}	% difference
1	.010 kg				
2	.020 kg				
3	.030 kg				
4	.040 kg				
5	.050 kg				

Calculations:
1. Solve for **a** (experimental) by the graphs in the experiment window.
2. Determine $\mathbf{F_a}$ by multiplying $\mathbf{m_a}$ by **g**.
3. Determine $\mathbf{a}_{(calculated)}$ using the formula **F = ma**. **(USE M_{total}, NOT m_a!)**
4. Calculate **% diff** between **a** values. Use $\mathbf{a}_{(calculated)}$ as your actual value.

Results:
1. Graph $\mathbf{a_{(exp)}}$ vs. **F** on the computer. (Which variable is independent?)

2. If the relationship between **a** and **F** is direct, what kind of line do we expect? What did we get?

3. Calculate the slope of the line. What does this value represent?

4. If the lab were repeated on the moon, which has a lower gravity, how would the results change?

5. Why does **m** have to include the hanging mass as well?