AP Physics C Center of Mass Activity

Names: _____ Period _____

Part 1:

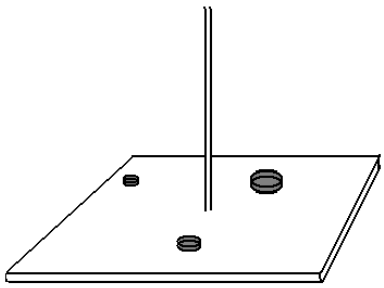
In this activity you will place a small mass and a ruler on top of a meter stick. You will find the center of mass of the system experimentally and theoretically. You will then find the percent difference between these two values. Use proper units throughout this lab.

- Mass of meter stick = _____
- Small mass value = _____
- Mass of Ruler = _____
- Location of mass on the meter stick = _____
- Location of ruler's center of mass on the meter stick = _____
- Experimental location of the system's center of mass = _____

Show calculation for the center of mass of your system. Start with the equation, then sub in the values (including units).

Percent difference calculation:

AP Physics C **Finding the Center of Mass in 2 Dimensions**



Part 2:

In this activity a board will be suspended from its center with a rope whose other end is attached to the ceiling. Two masses will be placed randomly on the board. It is up to the members in your group to decide where to place a third mass so that the plane of the board will remain horizontal to the ground. Your decision will not be based on the trial and error method but rather on your physical intuition and a mathematical model.

You will be given the following known quantities:

- the mass of the board
- the mass of each of the three masses
- the x and y location of two of the masses on the board

You will attempt to find the following:

- the x and y coordinates where the third mass should be placed so that the board is balanced.

Hints:

- You would like the center of mass of the board and masses to be at the point of suspension so that it will balance.

- Finding the center of mass in 2 dimensions takes twice as long as finding the center of mass along a line.

Note: the board will initially be suspended so that it is a certain height above the ground.

Scoring:

10/10 If the board balances the first time (i.e., none of the masses slide)

8/10 If the board balances the second time

6/10 If the board never balances.

Good Luck!

Position of 3 masses:

Group 1:	**200 g**	**1000 g**	**500 g**
		4,-7	0,16
Group 2:	**200 g**	**1000 g**	**500 g**
	-15, 10	5,5	
Group 3:	**200 g**	**1000 g**	**500 g**
	-20,15	15,0	
Group 4:	**200 g**	**1000 g**	**500 g**
	18,-4		18,16
Group 5:	**200 g**	**1000 g**	**500 g**
		-3,5	9,-3
Group 6:	**200 g**	**1000 g**	**500 g**
		0,4	-5,0