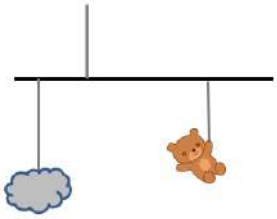
Mobile Lab DAL 1/13/23 **Name** _____ **Date** _____

Calculating Weighted Average of Positions



1. Select two objects of different masses which can be easily suspended from a string. For example, you could use a roll of tape and pair of scissors, or two small stuffed animals.
2. Select a rod strong enough to support your objects, and long enough that the objects will not bump each other when suspended.
3. For each object to be suspended, tie string around the object and then add an additional 20-40 cm of string hanging off. Tie a loop at the end large enough to go around the rod.
4. Measure and record the mass of the rod and of each object, including its supporting string.
5. Attach the string loops around the rod at opposite ends. They do not need to be exactly the same distances from the rod ends. You may tape the string to the rod to keep it in place.
6. Measure the distance from the left end of the supporting rod to each hanging loop. For the supporting rod itself, consider the mass to be at the center of the rod, so measure the length of the rod and divide it by two. Record positions.
7. For each object and for the rod itself, multiply the mass in grams times the distance from the left end of the rod.
8. Add up all the (mass x distance) products and record total. In the large box below, divide the total (mass x distance) result by the total mass. The result will be the position of the center of mass, where the rod and objects can balance.

Mobile Lower Level

	Rod Center	Object 1	Object 2	**Totals**
Mass (g)				
Position (cm)				
(Mass)(Position)				

Math:

Predicted Position of Center of Mass:_____

Did it work? (Did the mobile balance when you hung it from that point?)
If not, check your calculations!

9. To make a multi-level mobile, use a mobile as an object, or as both objects.

Mobile Second Level (Combine your mobile with another one.)

	Rod Center	Mobile 1	Mobile 2 (or another object)	**Total**
Mass (g)				
Position (cm)				
(Mass)(Position)				

Math:

Predicted Position of Center of Mass:_____

Did it work? (Did the mobile balance when you hung it from that point?)
If not, check your calculations!