Procedure for Lab 6 Atwood Machine.

The goal of the lab is to determine the relationship between the acceleration of an Atwood machine and the difference between its two masses and the sum of its masses. To do this we need the following equipment:

* Super pulley
* Smart Gate
* Mass Set
* Sparklink
* String

In some sense, this experiment is similar to Lab 5 where we measured the acceleration over time of the cart as the hanging mass was affecting it, causing it to accelerate. To measure the acceleration, we used a smart gate and a pulley to measure the rotation of the pulley on its axis. The rpm or rotations per minute, gave us the value of acceleration. Therefore, we can apply the same concept here by using a pulley and a smart gate to measure the acceleration as the second mass (heavier one) drops down and the first mass (lighter one) comes up. To set up the experiment, place the pulley over the edge of the table with the smart gate set up right above the pulley to accurately measure the rpm and thus the acceleration. With two hangers for the masses, tie a piece of string in between the two and place the string over the pulley. Then set up the masses. For example, the first mass would have a mass of 100 grams and the second mass would have a mass of 150 grams. This does not include the hanger mass which is 5 grams. Have a book or a solid piece for both of the hangers to rest on. This will ensure that the hangers are starting from rest and have no tension in the string. Then when ready, move the book or solid piece away and record the acceleration vs time in the software provided. Taking the data, plot a graph of the acceleration vs time. Perform the same test four more times for the same masses.

For part II of the experiment, change the weight of the first hanging mass, while keeping the second one the same. For example, second mass can be kept at a constant of 200 grams (not including hanger mass of 5 grams), and the first mass can be varied from 100 grams – 150 grams. For each mass, perform the experiment five times to obtain adequate data. So if we had three variations of the mass, 100 grams, 125 grams, and 150 grams, we would perform five tests for each, for a total of fifteen tests. Similar to part I, use the Smart gate and the Sparklink to record the acceleration vs time and then plot it.

For part III of the experiment, we are keeping the sum of both masses, so the total mass, the same, while changing the masses. Ex. Total mass is a constant at 300 grams; first mass = 125 grams, and second = 175 grams. Assume we are accounting for the weight of the hanger mass (5 grams). This would be the ratio for the first series of trials. For the second series of trials, keeping the total mass at 300 grams, the first could be 100 grams and the second would be 200 grams. The third series of trials would have the first mass at 115 grams and the second mass at 185 grams. For each set of trials, perform five tests, for a grand total of fifteen tests. Again, record the data and plot the acceleration vs time graph.