

# Accelerating Atwood Machines Preliminary Lab Protocol

## Physics

For the final lab, you will be predicting the motion of an Atwood Machine (see below) when multiple torques are acting to cause angular acceleration. In order to accomplish this, you need to know two things:

1. How can you measure  $I$  (the moment of inertia) of an Atwood Machine (or any rotating object) as precisely as possible? You will need, among other things, the formula for Newton's 2<sup>nd</sup> Law as it applies to rotating objects ( $\sum \tau = I\alpha$ )
2. How can you predict the acceleration of an Atwood Machine given two known masses hanging from two different (known) radii? You will need, among other things, the formula for Newton's 2<sup>nd</sup> Law as it applies to objects moving linearly ( $\sum F = ma$ ).

For this preliminary lab, explain in detail (i.e., **develop equations**) how you will accomplish both steps 1 and 2. Verify your work with the instructor. Then, carry out your procedure for step 1, **calculate the moment of inertia** for your Atwood Machine, and verify your work with your instructor.

