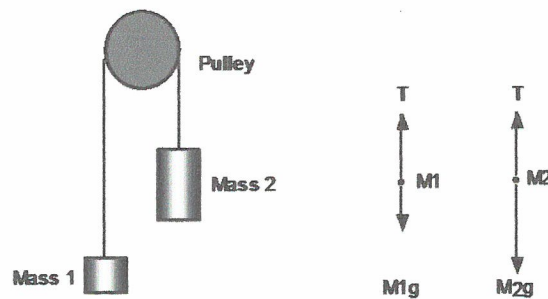


AP Physics 1- Atwood Machine (mini-investigation)

An Atwood machine consists of two hanging masses connected over a pulley that, when released, accelerates until it stopped.



At this point, we are going to assume the pulley is frictionless and massless, and, thus, has no impact on the acceleration of the two blocks.

Set up your apparatus.

Pre-Lab Activity: Draw a different depiction of the objects and forces in an Atwood machine.

Part 1: Same total mass, different net force

Steps to undertake:

- Add up the mass, including the hanger, for each of the two hanging mass sets in your system.
This is your total mass for all of part 1!
- Draw free body diagrams for each of the two hanging masses.
- Write the summation equations for the two hanging masses. The tension for each of the hanging masses is the same.
- Release the masses from rest, and experimentally determine the acceleration of the system.
- Move masses from one hanging set to the other to change the force on the system.
- Repeat for five different mass combinations, but keeping the total mass of the system constant.
- Graph the force vs. acceleration, find the slope of the line of best fit, and compare it to the total mass of the system.

Part 2: Same net force, different total mass

Steps to undertake:

- Set up the apparatus with different numbers of masses on each side.
- Find the total mass in the system.
- Determine the net force on the system based on your initial mass combinations.
Think about your alternate diagram if you are struggling.
- Release the masses from rest, and experimentally determine the acceleration of the system.
- Change the mass on each hanging set to maintain the same net force as prior.
- Repeat for five different mass combinations, but keeping the net force on the system constant.
- Graph the acceleration vs. mass for your five combinations.