WORK POPPERS LAB (L-14)

Introduction:

You had the opportunity to deal with a popper earlier in the year. At that time, you found the toy to be a semi-spherical piece of plastic that when turned "inside out" and placed on a table, would pop itself right-side-up and, in doing so, would catapult itself into the air. Because we are casting about for labs you can execute at home, you are going to cleverly use your popper to do an experiment that is based in the concept of work and energy.

Equipment:
1 popper
1 meterstick (or comparable measuring device)

Procedure and Data to be Taken:

1.) As you did in the previous lab, take the data required to calculate the velocity your popper had as it left the tabletop.
2.) Take the data that was required to determine how much acceleration the popper experienced *through its pop*.

Calculations:

1.) Briefly explain the procedure you will go through to determine the average acceleration the popper experiences *as it is popping*.
2.) Executing the procedure outlined in Calculation 1, determine the average acceleration the popper experiences *as it is popping*.
3.) Using the definition of *work*, determine how much energy was provided to the popper by the internal force that generated the acceleration calculated in Calculation 2.
4.) The *energy of motion* wrapped up in the popper just as it began to leave the tabletop was apparently dissipated as the popper moved upward in the earth's gravitational field. Use the definition of work to determine how much work gravity did on the popper between the end of its pop (i.e., when it left the tabletop) to the top of its motion (i.e., where it came to rest). Be careful of signs here.
5.) In a perfect world, how would you expect the magnitude of the two work values you've calculated to compare? Explain.
6.) In all probability, the two values didn't match up exactly. Which was bigger? Explain why you would have expected that.