Ping Pong Ball Launcher Project

Goal
Design, Construct, and Test a Mousetrap Powered Ping Pong Ball Launcher.

Design Specifications

- The launcher shall be able to be adjusted so that different targets distances can be obtained. This must be done in two ways:
  - The launcher shall contain a “firing pin” that is not directly connected to a human hand (i.e. multi-stage launch initiation).
  - The launcher shall have an adjustable launch angle that can be maintained without human intervention once it is set.
- The ping pong ball must be launched through a section of the PVC pipe.
- Markings on the device or measuring instruments may be incorporated into the body of the device for aiming purposes.
- No other detached instruments shall be used during setup to attempt to adjust the device for competition launching.
- One piece of paper may be used during competition, provided that the paper contains only launch test or performance data previously collected.

Construction Constraints

- 12 inches of PVC pipe
- One mousetrap
- Any other hardware, provided however, that the only source of energy is the spring on the single mousetrap and the only barrel mechanism consist of PVC pipe.

Additional Project Requirements

- You must determine the spring constant of the mousetrap. Force sensors may be used in conjunction with this inquiry.
Project Deliverables

- Fully functioning Mousetrap-Powered Ping Pong Ball Launcher – Each group will demonstrate their launcher on Friday, May 13th…no exceptions!

- Each student will turn in a well-formatted Excel workbook by the end of the day on Thursday, May 12th…no exceptions! As of the publishing date of this document, the workbook should contain:
  - Force-displacement data for determining spring constant
  - Graph used to determine spring constant
  - Data from launch trials showing launch range as a function of (1) launch angle and (2) firing pin position
  - Graph showing launch range vs. launch angle
  - Graph showing launch range vs. firing pin position
  - Theoretical calculations from energy considerations

  Check with D-Conn around May 4th to see if any of the requirements for the Excel workbook have changed!

- Each group will give a summary presentation (May 17th & 18th). You are to adhere to the general guidelines we have discussed for technical presentations. The PowerPoint file for the presentation is due on Monday, May 16th. Additionally, this presentation should
  - Be 5-7 minutes in length
  - Clearly discuss the use of the Engineering Design Process

- A test on Simple Machines and Energy will be given on Wednesday, May 11th. In preparation for the test, students are expected to
  - In addition to the assignments that you are to complete prior to this test, be able to discuss their Ping Pong Ball Launcher from the perspective of work and energy. Questions to consider include:
    - What energy conversions took place?
    - Was energy conserved? Why or why not? How do your test results support your answer?