Physics 200 Names: ___________________________________

Projectile Launcher Efficiency Investigation

<u>Pretend</u> for this assignment:

- There is no air resistance
- Rubber bands are ideal springs (i.e. pretend they have a constant, k).

Primary Goal: to solidify your general understanding of the underlying energy principles related this event. Don't focus on an extremely high level of precision.

Question: How will the efficiencies of an oak projectile and a steel spherical projectile compare when launched vertically from one of the class projectile launchers – using the same "power setting" for both projectiles?

Hypothesis [what do you think? Why?]:

Data: Experiment with the launcher until you can launch the <u>oak projectile</u> vertically to a point that almost reaches the ceiling. Then collect (or determine) the following for both projectiles at the same launcher setting:

1. Find the work done in cocking the launcher before firing (should be the same for both projectiles). To find this, you will need to measure the force applied to the string as you cock the launcher.
2. Record the starting height and ending height of the projectile during a launch.
3. Measure the projectile masses.

Problems, Data, Questions, etc. (so I can check your work and understanding**):**

Oak Projectile Mass = _________ Steel Projectile Mass = _________

What was the force required to stretch the "spring" to its fully cocked position? _________

How far was the spring stretched in the course of cocking the launcher? _______

How much work was done in order to cock the launcher? ______

		Height (m)	PEs (J)	PE g (J)	KE (J)	Total	Efficiency (%)
Oak	Low Point						
	Leaving Launcher						
	High Point						
Steel	Low Point						
	Leaving Launcher						
	High Point						

Conclusion: