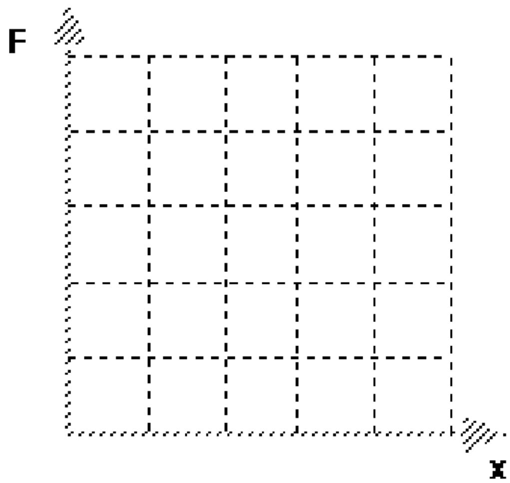
Name____________________________________

Date __________ Pd____

Unit IV: Worksheet 2

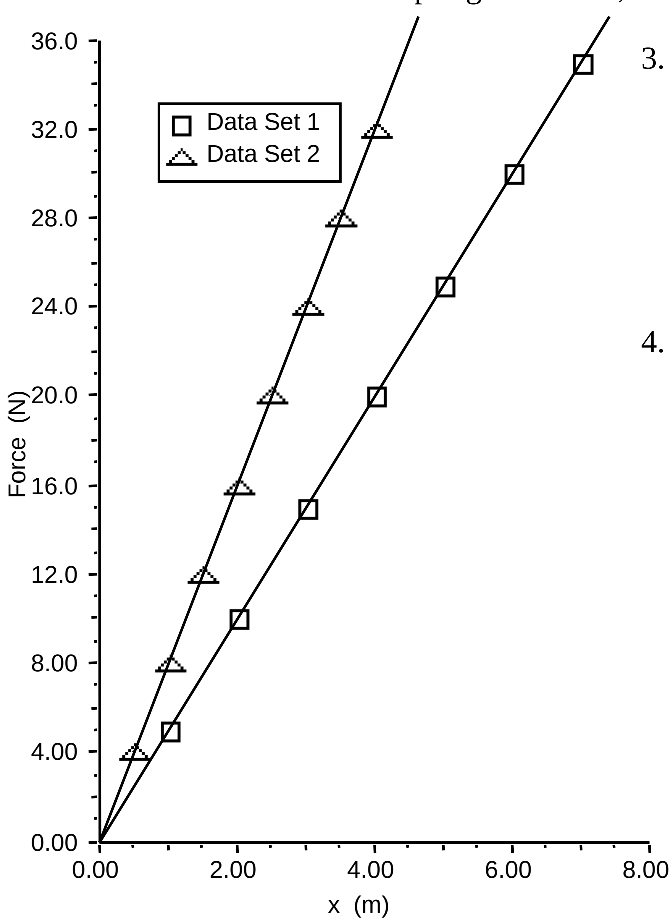
Suppose in the lab one group found that $F = 1000.\frac{N}{m}(\Delta x)$. Construct a graphical representation of force vs. displacement. (Hint: make the maximum displacement 0.25 m.)



1. Graphically determine the amount of energy required to stretch the spring described above from x = 0 to x = 10 cm.

2. Graphically determine the amount of energy required to stretch the spring described above from x = 15 to x = 25 cm.

The graph at left was made from data collected during an investigation of the relationship between the amount two different springs stretched, when different forces were applied.



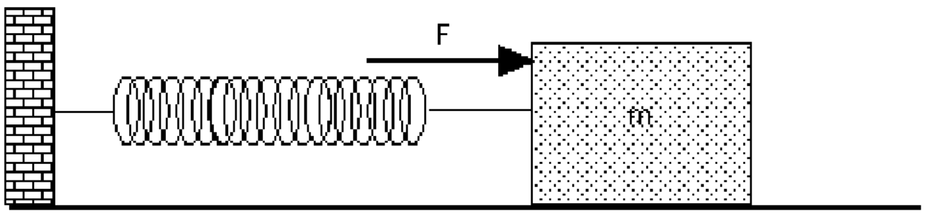
3. For each spring determine the spring constant.

4. For each spring, compare
   a. the amount of force required to stretch the spring 3.0 m.

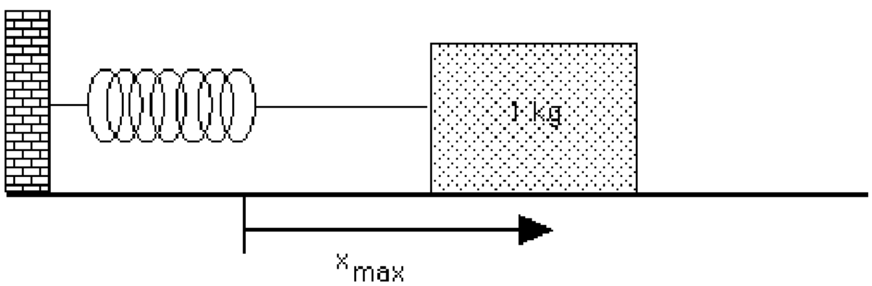
   b. the E_{el} generated in each spring when stretched 3.0 m.

5. Calculate the amount that spring 2 needs to be stretched in order to obtain 24 joules of energy.

6. The spring below has a spring constant of 10 N/m. If the block is pulled 0.30 m horizontally to the right, and held motionless, calculate what force the spring exerts on the block. Sketch a force diagram for the mass as you hold it still. (Assume a frictionless surface.)



7. The spring below has a spring constant of 20 N/m. The μ_s between the box and the surface is 0.40.



a. The box is pushed to the right, then released. Draw a force diagram for the box above when the spring is stretched, yet the box is stationary.

b. Calculate the maximum distance that the spring can be stretched from equilibrium before the box begins to slide back.

c. Sketch a 5-bar chart analysis for this situation, when the spring is stretched beyond its maximum (from part b above) so it slides back, and then the box oscillates back and forth. Assume your system includes the spring, box, and table top. **<u>Account for friction.</u>**