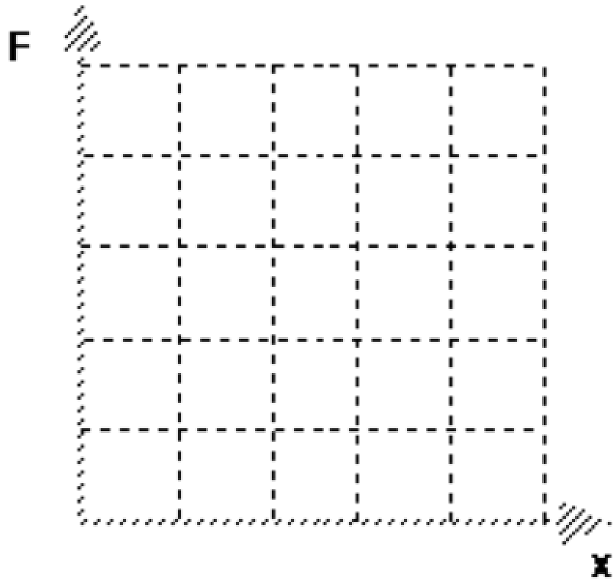
Name______________________________________

Date__________**Pd**____

Energy Storage and Transfer Model Worksheet 2:
Hooke's Law and Elastic Energy

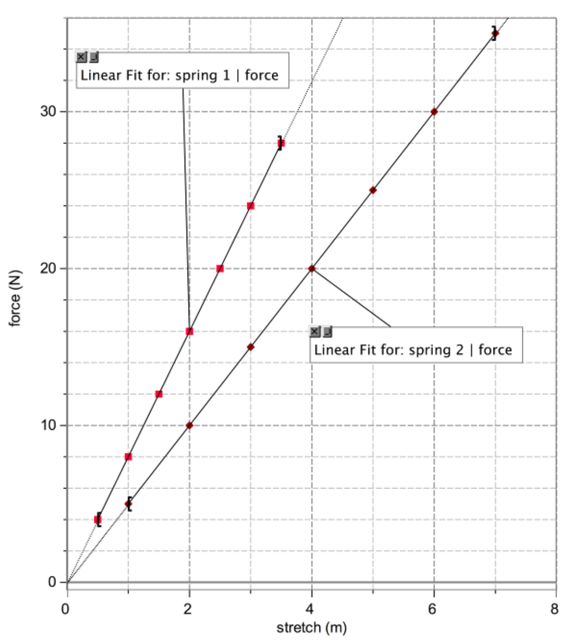
Suppose one lab group found that F = 1000 N/m (Δx). Construct a graphical representation of force vs. displacement. (Hint: make the maximum displacement 0.25 m.)



1. Graphically determine the amount of energy stored while stretching the spring described above from x = 0 to x = 10. cm.

2. Graphically determine the amount of energy stored while stretching the spring described above from x = 15 to x = 25 cm.

The graph below was made from data collected during an investigation of the relationship between the amounts two different springs stretched when different forces were applied.



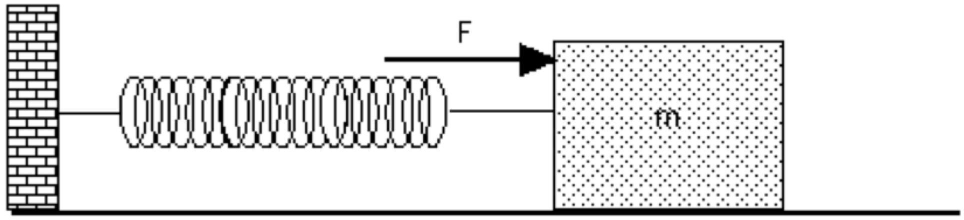
3. Determine the spring constant for each spring.

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

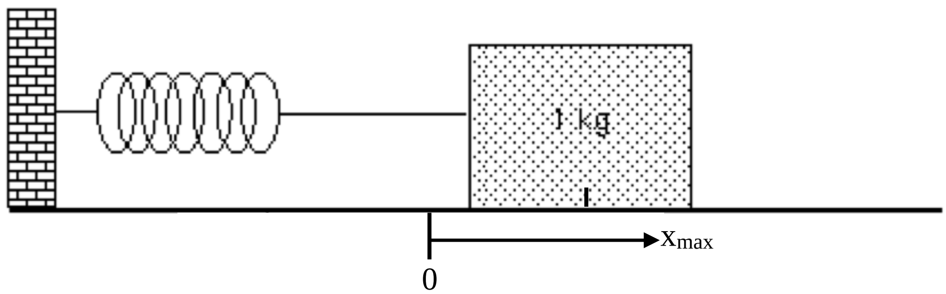
   b. the E_{el} stored in each spring when stretched 3.0m.

5. Determine the amount that spring 2 needs to be stretched in order to store 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, what force does the spring exert 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. What is the maximum distance that the spring can be stretched from equilibrium before the box begins to slide back?

c. Do pie 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 until it comes to a stop. Assume your system includes the spring, box, and table top.