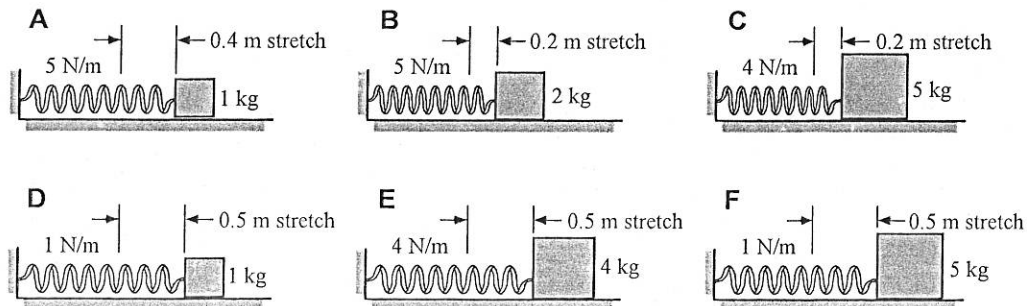


Post Lab Questions:

The figures below show systems containing a block attached to the end of a spring and resting on a frictionless surface. In each system, the springs are stretched by a student to the right by a distance given in the figure. The mass and force constant are also given for each system.



Rank these systems on the basis of the potential energy of the stretched spring-block systems.

Greatest 1 E 2 A 3 D 4 F 5 B 6 C Least

Please explain your reasoning.

- mass is not important  
- use  $U_e = \frac{1}{2}kx^2$

A:  $\frac{1}{2}(5)(.4^2) = 0.4$

B: 0.1

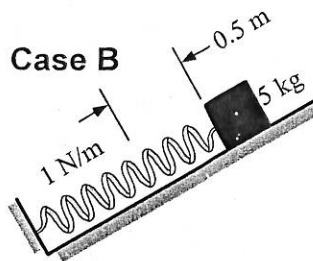
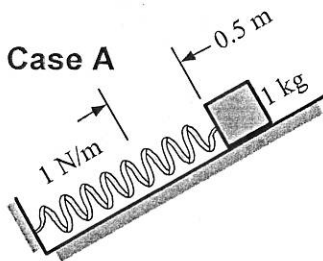
C: .08

D: 0.125

E: 0.5

F: 0.125

Two blocks are placed on a frictionless ramp and held against a spring that is compressed one-half meter. (The mass of the blocks and force constant of the springs are also given for each system.) The blocks are then released from rest, and the compressed spring causes the blocks to accelerate up the ramp while in contact with the blocks. At the instant shown, the blocks are just about to lose contact with the end of the spring. Three students are discussing how far the blocks will slide up the inclines.



**Andy:** "I think they will both travel up the same distance on the inclines. The kinetic energy at the point shown in the diagram is equal to the initial elastic energy stored in the compressed spring. This is the same for both cases since they both are compressed the same distance and have the same spring constants. The kinetic energy at the point shown is equal to the gravitational potential energy at the top. Since both the kinetic energy and the gravitational potential energy depend on the mass, the mass cancels out leaving the same heights for each case."

**Badu:** "Since they both have the same energies when they are initially compressing the springs, they have to have the same energy at the top when they stop. So the lighter mass has to go higher."

**Coen:** "I think the block in Case B will go higher since it has more mass and its momentum should be larger at the point shown since they both have the same initial potential energy."

Which, if any, of these three students do you agree with?

Andy \_\_\_\_\_ Badu  Coen \_\_\_\_\_ None of them \_\_\_\_\_