Warm Up: The Concept of a Force

Prof. Jordan C. Hanson

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1 Memory Bank

1. $\vec{F} = -k\Delta\vec{x}$ ... The "force" exerted by a spring compressed or stretched by a displacement $\Delta\vec{x}$.

2 Force and Springs

Consider the spring system in Fig. 1. When the gray box of mass m is pushed, the spring compresses, and when it is pulled, the spring stretches.

1. Suppose we hang a weight of 10 N from the spring, and it stabilizes at a length 10 cm. If the original length is 5 cm, what is the value of k?

2. Using this same spring, what is the force if we stretch it by 10 cm?

3. Suppose the mass rests on a flat surface, and is pushed in opposite directions by a spring with $k_1 = 2$ N/cm, and $k_2 = 4$ N/cm. If the system is at rest and the forces balance, what will be the ratio of lengths of the two springs?

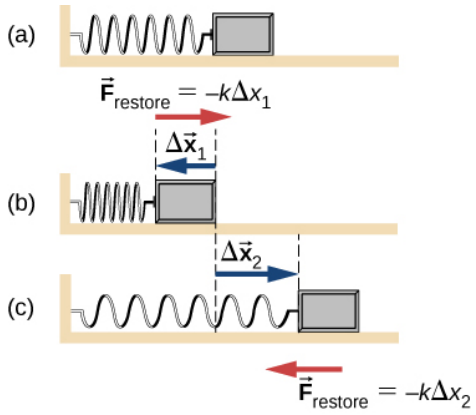

Figure 1: A spring exerts a force on a mass when compressed or stretched.