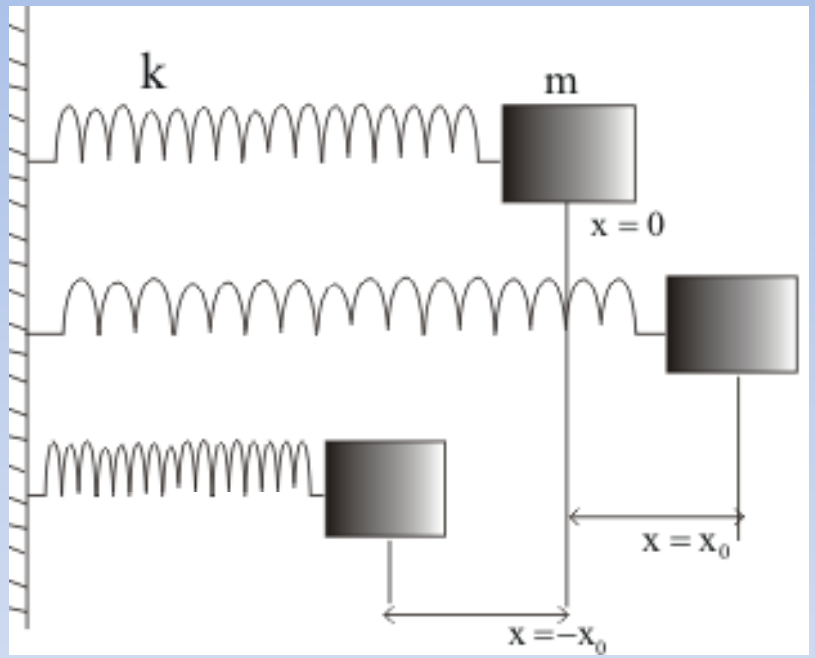
05-05

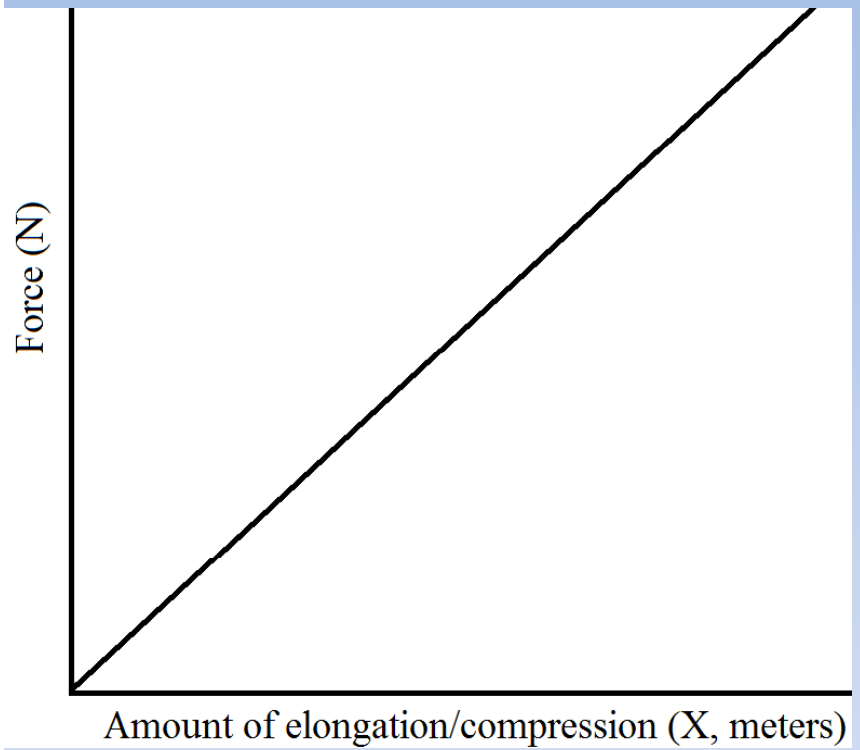
Work and forces of springs

Force on a spring



- Force to compress or elongate a spring is proportional to how much its stretched or elongated:
- F = kx
  - K is the spring constant (N/m)
  - X is the deviation from relaxed position (how many meters it's stretched or compressed by)

Work on a spring



- Springs store energy
- Spring energy = Work done (to stretch/compress spring)
- Work = F d
- The more you stretch a spring, the more forceful you have to pull (see graph)
- Work = F d = ½ bh = ½ x (kx)
- $W = \frac{1}{2} kx^2$

Work/Force - example

- A spring is 30 cm long relaxed and when a 200 g mass is attached, it elongates to 45 cm.
- How big is the spring constant, K?
- How big of a force is required to stretch it to double the relaxed length?