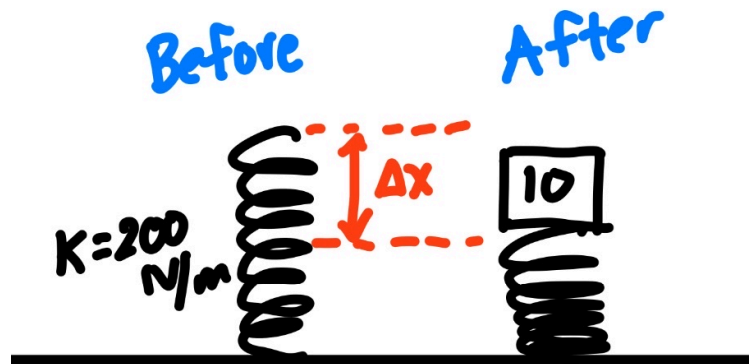


Springs

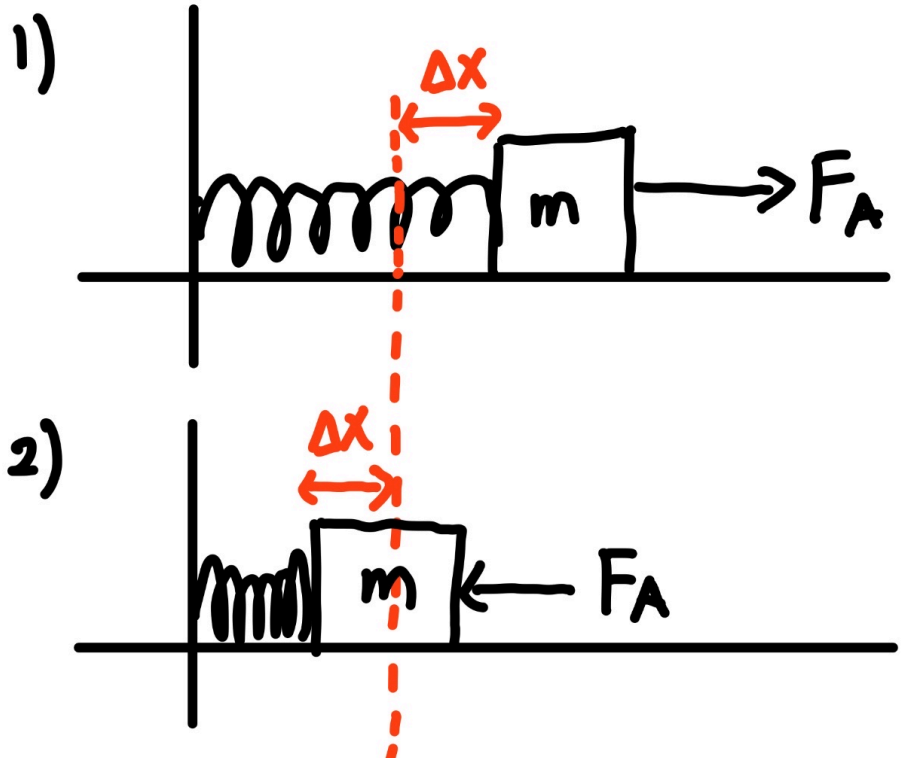
1. A 10kg box is placed on top of a vertical spring and compresses it. The spring has spring constant $k=200\text{N/m}$.

- a) Draw a FBD of the box. Remember that the box is not moving so the forces are balanced.
- b) How much did the spring compress by?



2. A mass $m=5\text{kg}$ attached to a horizontal spring is either pulled or pushed with an applied force of 100N . The spring has a spring constant $k=25\text{N/m}$.

- a) If the box is not moving, draw a FBD for each scenario.
- b) Calculate Δx for each scenario.
- c) Draw a FBD the moment the applied force is let go for each scenario.
- d) Calculate the acceleration of the block in each scenario the moment the applied force is released.



3. A 50g mass hangs from a massless spring attached to the ceiling with spring constant $k=140\text{N/m}$.

- a) How far is the spring displaced from equilibrium (find Δx)?
- b) The 50g mass is removed for an unknown mass. If the new $\Delta x=20\text{cm}$, what is the mass of the new mass?

4. You do an experiment to calculate the spring constant of an unknown spring. You have a block of mass 0.5kg and a 50cm spring. You place the spring vertically and put the mass on top of it and measure the length of the compressed spring to be 30cm. Calculate the spring constant.

