There are four components in the system shown below. Complete the free body diagram and write the equation for each of the components. The displacements \( x \) and \( y \) are assumed to be zero at the natural unforced length of the spring.

1) \( F_{\text{in}} - m_1 \ddot{x} + F_1 + F_2 = 0 \)
2) \( F_1 = -xk + yk = -(y-x)k \)
3) \( F_2 = x\dot{b} + yb = (y-x)b \)
4) \( -F_1 - m_2y - F_2 = 0 \)