Problem 4: (30 pts.) A 0.075 kg blob of sticky putty is dropped vertically onto a vertical spring. Take the position of the relaxed spring to be $y = 0$. The initial height of the putty is 0.040 m. The putty drops, sticks to the spring, and compresses the spring. After being compressed, the spring bounces back up, but the putty stays attached. The maximum height reached by the spring is 0.035 m. What is the spring constant of the spring?

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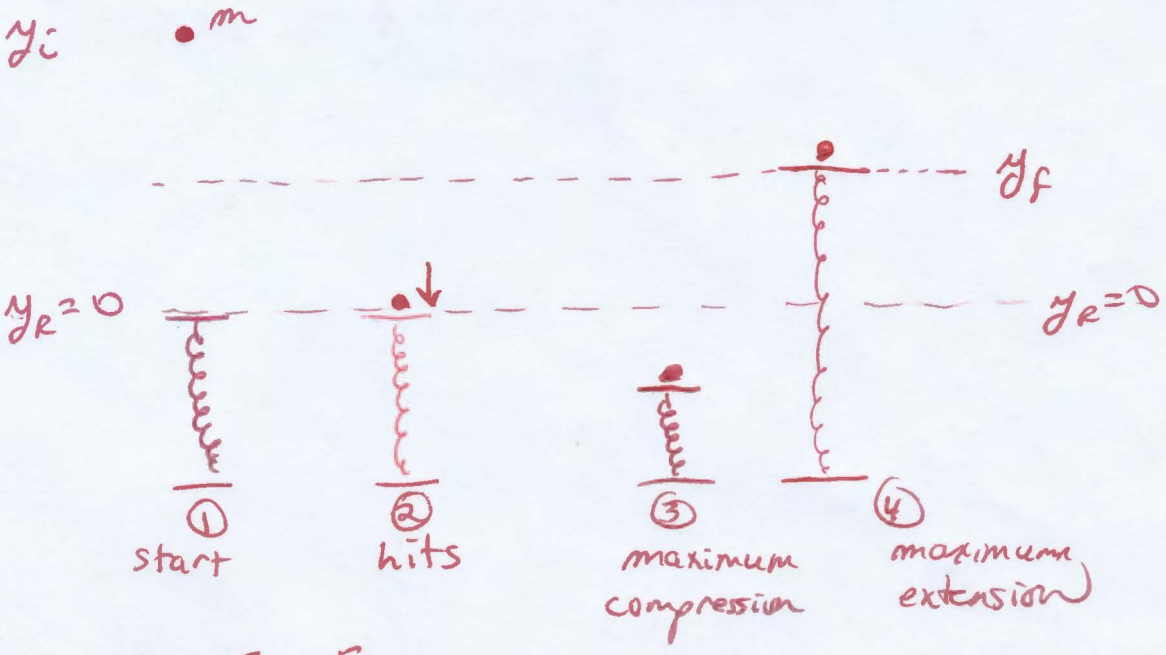

$$E_1 = E_4$$

$$U_1 + K_1 = U_4 + K_4$$

$$mgy_i + 0 = mgy_f + \frac{1}{2}k(y_f - y_R)^2$$

$$\frac{2mg(y_i - y_f)}{(y_f - y_R)^2} = k$$

$$\boxed{6.0\ \frac{N}{m} = k}$$