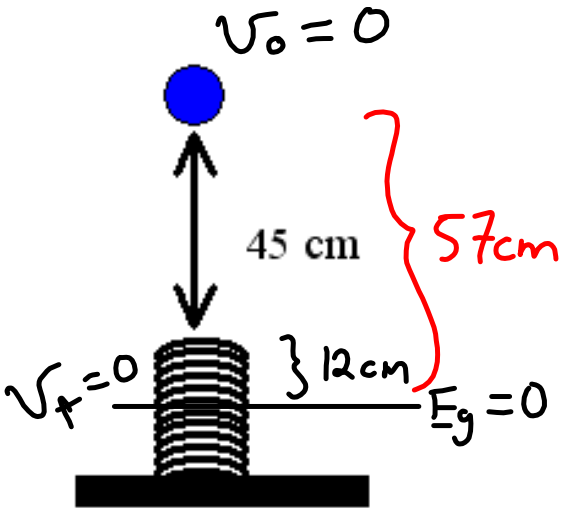
A ball of mass 6.0 kg is dropped from a height of 45 cm above a spring and compresses the spring by 12 cm. What is the spring constant of the spring? (k = 4700 N/m)

↖ Ball comes to a stop



$$\Delta E_T = 0$$

$$\Delta E_k + \Delta E_g + \Delta E_e = 0$$

$$(E_{gf} - E_{go}) + (E_{ef} - E_{eo}) = 0$$

$$-mgh_o + \frac{1}{2}kx^2 = 0$$

$$-(6)(9.81)(0.57) + \frac{1}{2}k(0.12)^2 = 0$$

$$-33.6 + 0.0072k = 0$$

$$k = \frac{33.6}{0.0072} = 4667 \text{ N/m}$$

$$k = 4700 \text{ N/m}$$