

9.  $x_{\text{spring}} = 0.011 \text{ m}$

$\Delta x_{\text{fall}} = 1.93 \text{ m}$

$$\frac{1}{2} kx^2 = \frac{1}{2} mv^2$$

~~$x = v_0 t$~~   
 ~~$h = \frac{1}{2} g t^2$~~   
 ~~$2gh = t^2$~~   
 ~~$t = \sqrt{2h/g}$~~   
 ~~$x = v_0 \sqrt{2h/g}$~~

$$V_2 = \left( \frac{2.2}{1.93} \right) V_0$$

$$V = \left( \frac{x_2}{x_1} \right) V_0$$

$$x_2 = \left( \frac{2.2}{1.93} \right) (0.011 \text{ m})$$

$$= 0.125 \text{ m}$$

$$kx^2 = mv^2$$

$$v^2 = \frac{kx^2}{m}$$

$$v = \sqrt{\frac{kx^2}{m}}$$

$$\Delta x = vt$$

$$1.93 = \sqrt{\frac{k(0.011 \text{ m})^2}{m}}$$

$$2.2 = \sqrt{\frac{kx^2}{m}} t$$