

9) equations:  $K = \frac{1}{2} m v^2$   $\Delta x = v_i t + \frac{1}{2} a t^2$   
 $F_s = -k \Delta x$   $U_g = m g \Delta y$   
 $U_s = \frac{1}{2} k x^2$   
 $v_f^2 - v_i^2 = 2 a \Delta x$

$$\Delta y = \cancel{v_i t} + \frac{1}{2} g t^2$$

$$\Delta y = \frac{1}{2} g t^2$$

$$t = \sqrt{\frac{2 \Delta y}{g}}$$

$$\Delta x = v \cdot t$$

$$\Delta x = v \sqrt{\frac{2 \Delta y}{g}} \quad v = \frac{\Delta x}{\sqrt{\frac{2 \Delta y}{g}}}$$

$$U_s = U_g$$

$$\frac{1}{2} k l_1^2 = \frac{1}{2} m v_1^2 \quad \frac{k l_1^2}{v_1^2} = m = \frac{k l_2^2}{v_2^2}$$

$$k l_1^2 = m v_1^2$$

$$k l_2^2 = m v_2^2$$

$$l_1 = 1.1 \text{ cm}$$

$$l_2 = ?$$

$$v_2 = \left( \frac{l_1}{l_2} \right) v_1$$

$$\frac{v_2}{l_2} = \frac{v_1}{l_1}$$

$$\frac{v_2}{l_2} = \frac{1}{l_1} \cdot \frac{D_1}{D_2} \cdot v_1$$

$$\frac{1}{l_2} = \frac{1}{l_1} \cdot \frac{D_1}{D_2} \rightarrow$$

$$l_2 = l_1 \cdot \frac{D_2}{D_1} = 0.01 \cdot \frac{2.2}{1.93}$$

$$= 1.25 \text{ cm}$$

$v \rightarrow$

$a \downarrow$

(y-direction)

$$v_i = 0$$

$$v_f = ?$$

$$a = -9.8$$

$$U_i = ?$$

$$t = ?$$

(x-direction)

$$v_i = ?$$

$$\Delta x = 2.2 - 0.27 = 1.93$$

$$t = ?$$

$$\Delta x = v \cdot t$$

$$D_1 = 1.93 \quad v_1 =$$

$$D_2 = 2.2 \quad v_2 =$$

$$\frac{D_1}{D_2} = \frac{v_1}{v_2}$$

$$\frac{D_1}{D_2} \cdot v_2 = v_1$$